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CONTENTS

EDITORIAL:

The Statistics of United States Railroads 169
Responsibility for the Mentor Disaster... 169
Chicago Passenger Terminals..... 169
Some Influences Affecting Tonnage Rating 170
Railroad Rumor and Reality..... 171
July Accidents 171
Maximum Speed on German Railroads.... 172
Japanese Railroad Building in Korea.... 172
Buffalo, Rochester & Pittsburg..... 172
Central of Georgia 172
Trade Catalogues 173

ILLUSTRATED:

Philadelphia's Rapid Transit Railroad... 174
Convertible Electric Motor-Cars; B.H.R.R. 178
Handsome Passenger Locomotive of 1861. 183
D., L. & W. Improvements at Newark, N.J. 184
Tank Cars for Argentine Government Rys. 186
Standard Bridges on the Harriman Lines. 188
New Passenger Station of the Lehigh Valley at Rochester, N. Y..... 191

CONTRIBUTIONS:

Railroad Organization 173

MISCELLANEOUS:

The Cost of Locomotive Operation..... 181
Handling Fast Freight on the Santa Fe.. 184
Time Freight on the Boston & Maine.... 186
Reports on the Mentor Disaster..... 188
Statistics of U. S. Railroads in 1904.... 190
The Thirteenth Annual Convention of the National R.R. Master Blacksmiths' Assn. 191
Train Accidents in United States in July 191

GENERAL NEWS SECTION:

Notes 57
Personal 59
Elections and Appointments 59
Locomotive Building 60
Car Building 60
Bridge Building 61
Railroad Construction 61
Railroad Corporation News..... 63

VOL. XXXIX, No. 8. FRIDAY, AUGUST 25, 1905.

The Interstate Commerce Commission statistics of United States railroads, printed in this week's paper, are a year old, as usual, because of the elaborate nature of the facts presented and the time required to get them together. They are open to the criticism that in many cases they are merely averages of results obtained from so large a number of roads, operated under such widely different conditions, that they have no great intrinsic value. This is especially true in figures like those showing traffic density or passenger and ton mileage per mile of line throughout the country; yet even these rather idle averages have considerable news interest and compared with similar returns through a series of years, they would show quite clearly, in a large way, the general trend of American railroad traffic. Some of the items, however, are of great value as representing an aggregate instead of an average figure. It is worth while to know that out of the total route mileage fully reported to the commission of 212,243 miles, only 1,323 miles was operated by receivers. Although this figure is 137 miles greater than that for the year ending June 30, 1903, when the returns are in for the year ending June 30, 1905, this bankrupt mileage will presumably be materially less. It will be recollected that the year ending June 30, 1903, included the last half of 1902, when there was a great shortage of equipment all over the country. It is not surprising to learn, therefore, that the number of ton miles run per freight locomotive was considerably smaller in 1904 than in 1903, and that the average number of locomotives per thousand miles was 220 as against 214 the year previous. It is encouraging to see a very large increase reported in the number of locomotives and cars in service fitted with train brakes, while out of 1,692,194 cars in freight service on June 30, 1904, less than 18,000 were without automatic couplers. The total capital stock outstanding amounted to $2,696,472,010, and of this 42.53 per cent. paid no dividends; but the remainder received dividends equivalent to 6.09 per cent. Two especially striking figures stand out in these traffic returns. One is the aggregate increase of the ton mileage, amounting to 1,003,810,584. The other is the aggregate increase in passenger mileage—1,007,449,655. Both these figures indicate with great certainty the enormous growth in the country's business, but the figure for passenger mileage is the most interesting, for the percentage of increase was over 4 per cent., while the percentage of increase in ton mileage was ¾ of 1 per cent. In the growing up of the country around the lines that only a few years ago were little more than pioneers, it is obvious that this passenger traffic is to have increasingly great returns year by year and be a very important added source of profit to many companies that have been accustomed to rely chiefly on their freight traffic for means of livelihood.

The Coroner of Cuyahoga County and the Railroad Commissioner of the State of Ohio have made reports on the Mentor wreck, but they leave the question of the cause still very much in the dark. The Commissioner does nothing at all about the question of responsibility for the misplaced switch, leaving it to the Coroners (investigations were made by the Coroners of two counties); and the Coroners' action is inexplicable. The Coroner of Lake County appears to remain silent, while Coroner Siegelstein, of Cuyahoga County, gravely informs the public that he has reached a conclusion "by deduction." He believes that the operator at Mentor set the switch for the side track, and he gives a part of his reasons for the belief; but beyond that publishes nothing. Whether he or the Railroad Commissioner examined the operator who is thus seriously accused, or whether either of them possesses any direct evidence in favor of or against him we are told nothing. Railroad Commissioner Morris, in his preamble, assumes that the Governor of the state is "solicitous for the safety of the people." This assumption is undoubtedly correct. Such being the case, and the reports now issued being so incomplete, we are bound to conclude that a solicitous Governor will see that some investigating body, or officer, with full power and authority, gives the public a full and clear account of this mysterious derailment.

CHICAGO PASSENGER TERMINALS.

It is to be hoped that the recent newspaper rumor of a new passenger station in Chicago means either more or less than appears on its face. According to this report, the Wabash, through the Chicago & Western Indiana, a Chicago terminal road, plans to build a new station to be occupied by the same companies which now have their terminals in the present Polk Street, or as it is no less generally known, Dearborn Street station. These are the Wabash, Erie, Grand Trunk, Chicago, Indianapolis & Louisville (Monon) and Atchison, Topeka & Santa Fe. Any such project as this for a new independent station would be a distinct backward step in the ultimate solution of the Chicago passenger terminal problem, for the more extensive the improvements made under existing arrange-

ments, the more difficult and more expensive will it be to abandon them when the time comes for a general reorganization of the passenger terminals in Chicago. This, as is familiar to any one knowing Chicago, must come about through bringing together at least a majority of the 22 trunk lines entering that city. In the *Railroad Gazette* of January 13, page 38, the Chicago situation was described in detail, and a plan was presented by Mr. Frederick A. Delano for uniting most, and if advisable all, of the 22 trunk line passenger terminals in five or six large station buildings side by side and fronting on either Twelfth street or on Taylor street one block north. This site is directly south of three of the present terminals, the Polk Street, La Salle Street and Grand Central stations. Of these the Grand Central is the terminal of the Baltimore & Ohio, Chicago Great Western and Pere Marquette. The La Salle Street station is occupied by the two Rock Island-Frisco lines, which reach Chicago, namely, the Chicago, Rock Island & Pacific and Chicago & Eastern Illinois, and by the Lake Shore & Michigan Southern and New York, Chicago & St. Louis (Nickel Plate). Another Vanderbilt line is soon to use this station, it is said. The Cleveland, Cincinnati, Chicago & St. Louis (Big Four) now uses the track and motive power of the Illinois Central for the 56 miles from Kankakee into Chicago. In order to give this line its own Chicago connection, the Indiana Harbor Railroad, at present a relatively unimportant outer-belt line, is building under Vanderbilt auspices a line from Indiana Harbor on the Lake Shore & Michigan Southern south about fifty miles to a connection with the Big Four near Danville, Ill. When this new line is finished the Big Four will be able to enter the La Salle Street station over the Lake Shore tracks. The five roads which use the Polk Street station have already been mentioned. These three stations are particularly well situated for falling in with Mr. Delano's plan. Leaving out of account the rest of the 22 railroads entering Chicago, there are 12, and with the Big Four 13, trunk lines occupying these stations. In addition there are the Illinois Central, Michigan Central and Wisconsin Central, which run into the Illinois Central station near the lake on Twelfth street, and the Pennsylvania's Pittsburg, Fort Wayne & Chicago line, the Chicago & Alton and the Chicago, Burlington & Quincy, which now run into the Union station. These and the Pittsburg, Cincinnati, Chicago & St. Louis (Panhandle), the other Pennsylvania line, which also uses the Union station, could all with no very special difficulty make use of the proposed terminal, for as Mr. Delano suggested they all enter the city either from the south or from the west, south of Fifteenth street. This would leave the two roads which enter the city from the north, the Chicago, Milwaukee & St. Paul, now in the Union station, and the Chicago & North-Western, which has its own terminal, to unite perhaps in a new station on the north or west sides, or what would be, even in their case, far from impossible, to run their through trains into the proposed new terminal.

The recent newspaper item is suggestive because since the publication of the article on the Chicago terminals, Mr. Delano has been appointed operating and managing head of all the Wabash properties. Although a denial of the story has already appeared which explains that the land purchased by the Wabash is for new freight terminals, it is certainly to be hoped that either the Wabash, through Mr. Delano, or some other road, may soon take the initiative in a successful project for new passenger terminals in Chicago. As Mr. Delano says, the real difficulty of the situation is in bringing together the actually or potentially discordant interests. His plan may not be the best plan, but unless Chicago is willing to settle down permanently to her present scattered and, in more than one case, out-of-date passenger stations, there must be concessions on all sides, in many cases sacrifices, and a general co-operation for the general good. Once let the problem be thus confronted and the long-desired changes are pretty sure to be found comparatively easy of solution. When the plans finally shall be brought to a successful conclusion and a great union station or union of union stations stands in Chicago, the great wonder will be, if similar cases are any precedent, how the old conditions were so long endured.

SOME INFLUENCES AFFECTING TONNAGE RATING.

Tonnage rating is an old topic for discussion, and the principles are pretty well settled as to about what should be done in order to secure satisfactory results. The dynamometer car has taken the place of office calculations, and is apparently better adapted to the practical requirements of both the mechanical and transportation departments. Its advantage lies in the fact that it gives the actual resistance over each section of track and takes all inequalities into consideration in a way that is impossible with purely theoretical work. As an example of this, a calculated tonnage rating assumes a given compensation for curves on grades and a given resistance of cars on curves; assumptions not borne out by fact. With short trains they may be correct within an inappreciable margin of error, but as train lengths increase, the error increases in an unknown ratio until we presently find that the engine cannot haul the maximum train which the figures based on the above assumption tell us that it ought to haul.

This influence of the length of the curve on train resistance does not seem to have received much, if any, attention on the part of the engineering department. It is customary to cut down the grade a certain definite amount, varying in practice, but averaging about 1.4 ft. per mile for each degree of curvature. That this is incorrect if applied to all curves indiscriminately will be readily understood after a moment's consideration. It is generally assumed that because the front wheel of the truck is grinding into the outer rail of a curve and because that outer rail invariably shows the greater amount of wear, that the pressure against the inner rail is comparatively slight and may even be neglected. This is far from being the case. Owing to the inequality in the length of the rails and the equality in the circumference of the wheels, the inner wheels naturally run ahead of the outer ones and crowd the front outer flange sharply against the rail, increasing its pressure as the curvature increases. At the same time the whole truck is swung ahead of the true radial position and the flange of the back inside wheel is also pressing against the inner rail. Whether this pressure is equal to that of the forward outer flange against the outer rail, is not known, as neither of these pressures have yet been measured. It is evident, however, from a purely theoretical standpoint that the pressure against this inner rail must be considerable; due solely to the fact that the truck is out of true radial alinement. This pressure is increased by the pressure of the car body against the center plate. The car is pulled at its end, and, when it is on a curve, there is a tendency on the part of the car at either end to move it towards the inside of the curve; a tendency which adds to the pressure of that flange against the inside rail, so that it is quite possible that this pressure, on slow-moving trains, may be greater than that against the outer. Of course, the inner tendency of the car does not occur where the speed is such that centrifugal force balances or exceeds that increment of train pull tending to move the car towards the center of curvature.

As for the inequality of rail wear, that is easily explicable from a consideration of the relative positions of the wheels and rails. When cutting is to be done with the ordinary tool, either in wood or metal, the edge is advanced and pushed over the surface, and the angle at which it is made to stand to the surface to be cut determines, to an extent, the depth of cut. But if the edge were to be reversed and dragged over the surface, as in the whetting of a knife, there is no cutting, but merely a wear due to abrasion, even though the pressure applied were many times greater than that put upon an advancing edge. So it is in the case of the two wheels of a truck. The forward outer wheel stands at an angle with its flange pressing against the rail. It has a tendency to gouge into and climb over the latter so that it inevitably follows that the wear is severe. The rear wheel, on the other hand, is dragging its flange over the rail like an ax on a grindstone, causing comparatively little wear, but setting up a strong frictional resistance. And this frictional resistance naturally increases with the number of cars and the sharpness of the curvature. There is evidence that this pressure increases with the angle at which the engine stands to the car, and is not entirely dependent upon the angle between two adjacent cars. In other words, the length of the curve has an important bearing upon curve resistance. Dynamometer car tests over two curves on the same grade, will show that the resistance, per ton, will be greater on the longer curves. Of course, after a curve becomes longer than the train, additional length has no influence whatever in increasing the resistance. For example, if the train is 2,000 ft. long, a curve of that length imposes the maximum resistance, and one of 4,000 ft. adds nothing except to the distance over which the maximum resistance will have to be overcome. But it will be found that one of 1,200 ft. will impose much less of a load per ton due to curvature than the longer curve.

Therefore, it is evident that curve compensation on grades should be on a sliding scale, in which train length and curve length should receive due and complementary consideration. It is in determinations such as this that the dynamometer car is of such prime advantage in settling the tonnage ratings. The adjustment for light

and loaded cars has been accepted as the practical solution of the problem of keeping the engine up to its work at all times, and the method of making this adjustment varies on different roads and will probably vary for some time to come until the averages of the different resistances are better known than they are at present.

Practical operation is, however, tending towards greater uniformity, and we find the use of the pusher engine coming more and more into play. Instead of rating an engine for the ruling grade and giving it all it can take over it, the rating is put much above this, and pushers are provided on all the hills. Examples of this can be multiplied indefinitely, but the cases of the Pennsylvania Railroad on the Pittsburg Division, going west out of Altoona, and the Bessemer & Lake Erie, between Pittsburg and Conneaut, where eight hills are provided with pushers, will serve as examples of means of securing a high tonnage rating while keeping the trains moving at speed, with no danger of stalling and the necessity of doubling. Finally, there is coming to be a more general appreciation of the desirability of a reserve of power in the locomotive and of the fact that there must be no danger of stalling. It is desirable, of course, to haul the maximum load between terminals, but this maximum load should not be the heaviest which the engine can haul over the steepest grade, while the remainder of the run is made with a comparativly light load; but load that can be hauled over the division with assistance from a pusher at certain points. For it is certainly more economical to assist a train over the steepest grade than it is to allow a few short sections of five or six miles in length to become the controlling element of the train-load for the whole length of a division.

In the case of the Bessemer line, it was stated in one of the early reports of the company, in commenting on the high train loads that were moved, that it was cheaper to help the traffic over the hills than it would be to reduce the grades. This, however, is a matter of purely local concern, and must be worked out and the proper action taken for each individual case. In a general way, it appears to be the current tendency to rate engines in such a way as to allow them a margin of power for the work they have to do, so as to have this reserve that can be called into action in emergencies; to use pushers liberally and systematically, and to adjust track conditions to best subserve the ends of the traffic requirements. It is to be regretted that the same sentiment does not seem to prevail in the passenger service. Here, there is a constant tendency to overload. Engines are placed on runs that can barely make the schedule with the normal train. An extra car, a head wind or a slippery rail means a continual loss of time, late trains, disgruntled passengers and a disarranged yard service. In this, superintendents seem to forget that there comes a time when the speed is so high that the drawbar pull disappears and the engine can just move itself, and that every machine has its limitations, which should receive as much consideration in passenger as in freight service, if not more.

RAILROAD RUMOR AND REALITY.

At an epoch like the present, when railroad values in the stock market have their times, reaching through weeks, of dancing up and down with acrobatic liveliness, and when a single great company's share capital may rise or fall in the quoted price five or ten million dollars in a day, the student of American railroad history has occasion for some instructive reflections. A "boom" period of railroad securities in Wall Street is peculiarly rich in its contrasts and parallels, both near and far in time. By this we do not refer to the mere comparison of prices between "boom" epochs and those of depression, though such a comparison is often striking as well as instructive. What we do mean is the contrast in the effect of certain forces, partly sentimental, as they bear nowadays upon railroad values in "The Street" in comparison with earlier days of railroad finance and investment. Among a number of such interesting studies is the change which time has wrought in the relative powers of railroad reality and railroad rumor.

Let us illustrate the case somewhat concretely. A few decades ago a bad railroad accident—particularly if the blame fell upon the operating corporation with consequential damages—dropped heavily on the stock of the road. The stock fell instantly, and recovered very slowly. A different kind of calamity may be illustrated by the Schuyler frauds on the New York and New Haven corporation, which needed fourteen years in which to outlive its misfortune. Or, coming down to a later period, wars of rates, while not often sudden, were prolonged and disastrous; and like in kind were the Granger attacks on the Western roads during the early seventies. All these were railroad realities, and very serious ones. They were serious chiefly because they fell on isolated lines, and often on small lines before the days of consolidation and of the modern great railroad "system." All that is now changed. A railroad accident like that in the New York tunnel, huge as was its cost in damages, hardly flinched New York Central stock, and is now all but forgotten. The day after the destruction of the Lackawanna terminal by fire, the stock made a new high record. A war of rates, unless on an immense scale, Wall Street would laugh down as but transitory. Even the attack on rates of the Federal Government awhile ago produced hardly an appreciable effect on values—and that effect but momentarily—and was later eclipsed in the pervasive rise of railroad securities.

But, albeit in an age of materialisms, while the scope and influence of the railroad Reality has thus diminished, or seemingly so, those of the railroad Rumors have waxed big. They range through a vast scale, reaching all the way from the two-line news item that forecasts increased earnings of a petty road up to the column that outlines hypothetically the mergers of a trans-continental system. They crowd page on page of the financial journals; and the strangest fact of all is that so many of them "go," and are interpreted into terms of actual influence. "Time does not wither or custom stale" either their infinite variety or their power. The rumor, well heeled, of a merger, of a holding "company," or shift of shares into bonds, spells bigger results in immediate market values than bed-rock realities or the positiveness of official announcement. One sees, too, some singular outcomes of a secondary character. The railroad "lifted" ten or fifteen points by Rumor will hold its place for months after Rumor has been killed by Reality.

All these are, of course, but phases of our up-to-date railroad speculation which organically fosters rumor and makes the meat it feeds on. But behind the skirmish line of speculation is the solid rank and file of investors, who analyze situations, who study actual returns, who estimate railroad management by its *personnel* and established traditions, and with whom reality still outweighs rumor. In the long run, and counting periods of boom and periods of break together, that class undoubtedly comes out far better than the average railroad speculator who plays on rumor as upon a lute. To the hesitant railroad investor that fact is a warning. To the railroad student the wider play and higher potential of Rumor in contrast with Reality has deeper meanings. It suggests, negatively, the immensely increased number of elements in modern railroading on which speculation can lay its hazards, and positively the resistive power of the modern railroad, not only as against accidental misfortune but as against speculation itself. Spite of Rumor and the results of it in the ups and downs of Wall Street, the shady railroad stock of a few years ago has become very often indeed the regular dividend payer of to-day; and Reality survives as an enduring fact, while Rumor plays her more conspicuous daily antics around her.

July Accidents.

The condensed record of the principal train accidents which occurred in the United States in the month of July, printed in another column, contains accounts of 23 collisions and 25 derailments. Those which were most serious, or which are of special interest by reason of their causes or attending circumstances, occurred as follows:

		Killed.	Injured.
4th	Viley, Ky.	0	22
5th	Wachusett, Mass.	3	2
6th	Springbrook, N. D.	1	32
8th	Marion, N. Y.	3	2
14th	Steiger, Ill.	3	6
15th	Upton, Ind.	4	8
16th	Landry, La.	3	0
18th	Romeo, Ill.	1	3
23d	Unionville, Ia.	3	0
27th	Myers, Mont.	4	0
29th	Diaz, Ark.	2	9
29th	Ozark Junc., Ark.	0	42
29th	Lemont, Ill.	3	18

July shows no such notable disaster as the three which gave such unhappy prominence to the two months preceding, and yet these 13 principal items in the present record aggregate 30 persons killed, an average of $2^1/_3$ to each accident. Moreover, a study of the causes of these accidents is by no means dull reading. In at least three unexplained derailments the tender was the first vehicle to jump the track, a fact suggestive of the need of improvement in the design of tenders or better care in managing them. The butting collision at Viley, Ky., is said to have been caused by one of the trains running a minute ahead of time. Can it be that this loose practice is due to mental confusion arising from the use of the space interval and the time interval mixed together? The circum-

stances of the Springbrook derailment indicate that it came very near being one of the worst disasters. The collision at Romeo, Ill., seems to have been likewise characterized by apparently miraculous escapes. The collision at Steiger, Ill., on the 14th, was like that on the Lancashire & Yorkshire last month, where 20 passengers were killed, the striking difference being that at Steiger the presence of a locomotive at the head of the train protected the lives of th passengers. If we do not take more effective measures to prevent collisions, the general introduction of electric cars will be accompanied by a demand from the public that every electric train be equipped with a dead steam locomotive in front to serve as a buffer!

The number of electric-car accidents reported in the newspapers in the month of July was 22, in which three persons were killed and 127 injured.

The number of express trains on the German railroads was increased materially when this year's summer time-table went into force, and also the number of those running at high speed. The speed has always been limited by law, but the restrictive regulations were changed last November. The greatest permissible speed under the most favorable conditions previously had been 100 kilometres (62 miles) per hour; the new regulations permit a speed of 59 miles per hour on down grades of 41 ft. per mile, 65 miles on grades of 26½ ft., and 75 miles on grades not exceeding 17 ft. per mile. Similar limitations apply to curves: 59 miles per hour may not be exceeded on curves of 2,625 ft. radius, 62 on those of 2,952 ft., 65 on those of 3,280 ft., 68 on those of 3,607 ft., 71½ on those of 3,934 ft., and the maximum permissible anywhere on curves of 4,265 ft. radius. In this connection it must be remembered that a large part of the German cars have long wheel-bases and are four or six wheeled cars.

In accordance with these new regulations, last winter's time-tables had several trains running at speeds previously unattained; but the summer tables have a much larger number, though only in considerable augmentations of speed over last winter's fastest trains.

These latter show 35 trains timed to run at the rate of 50 miles an hour or more over stretches of from 35 to 100 miles where they run without stopping at intermediate stations. The fastest of these runs from Hamburg to Wittenburg, 99⅓ miles, in 1 hour and 51 minutes, which is at the rate of 53½ miles per hour. In the reverse direction it takes 1 minute longer. Continuing from Wittenberg to Berlin, 79 miles, it runs at the rate of 52 miles per hour. From Berlin to Dresden, 117 miles, the time is 51½ miles an hour. Six different trains run from Berlin to Halle, and two from Halle to Berlin, 100½ miles, in just 2 hours. There is a run without a stop for passengers, but one for water, from Berlin to Hanover, 158 miles in 3¼ hours—48½ miles an hour. The number of trains which run 100 miles or more without stopping is 34.

Among the feats accomplished by Japan recently, that of building a railroad the whole length of the peninsula of Korea, some 550 miles, has been obscured by other deeds of a different nature. Readers of the *Railroad Gazette* have been informed of the beginning of this work, which dates back to 1902, but that it should have been completed so soon is surprising; for comparatively little track had been laid when the war broke out, and that on the southeastern end, from Fusan, opposite the Japanese port of Shimonoseki, some 8 or 10 hours distant by fast steamers. Thence to Seoul, the capital, about half way to the Manchurian border, the distance is 260 miles, and the work could be prosecuted in both directions; for Seoul already had a railroad 26 miles long connecting it with its port, Chemulpo,—a railroad built by Americans, but in 1899 transferred to a company consisting of wealthy Japanese. This line from Fusan to Seoul is across a hilly country and has 31 tunnels, aggregating 8 miles in length and 4 miles of iron bridges. The line north of Seoul to Wiju was originally undertaken by a French corporation, but was acquired by Japan when the war began. Very little has been said of the work on this line; but now it is reported completed; though it is yet to be connected by a short line in Manchuria with the Chinese Eastern near Lao-Yang. But besides this line the length of the Korean peninsula, the Japanese have made such progress on a line across it, from Seoul northwest to Wonsan (otherwise Gensan) on the north coast, 160 miles, that there is talk of opening it early next year. Besides this, a branch is begun from a point north of Fusan to the port of Masampo, west of Fusan, which will give the main line two outlets on the coast. Altogether, evidently a great development of traffic in Korea is expected when the war ends.

Buffalo, Rochester and Pittsburg.

The report for the year ending June 30, 1905, shows an increase in mileage worked from 499 to 538 route miles, and also an increase of 51 miles in second track and sidings owned and leased. Gross earnings increased from $7,529,958 to $8,161,079, but the increase in operating expenses was slightly greater, so that net earnings were $3,102,267, as against $3,121,151 last year. The outstanding capital stock was increased during the year $3,000,000 (common) and now amounts to a total of $16,500,000. The proceeds of this were used primarily to pay the balance of the cost of the Indiana branch, which runs into the coal fields located some 40 miles northeast of Pittsburg. The net increase in bonded debt during the year was $592,000, constituting the issue of $789,000 new equipment bonds authorized in former years and the cancellation of 197,000 car trust and equipment bonds. During the year expenditures were made for 15 new locomotives, 1,038 freight cars and other miscellaneous equipment, of which six freight and 21 service cars were built at the company's shops. The equipment account was also credited for equipment sold, transferred or destroyed with $314,192 charged to operating expenses. It is customary on this road when rolling stock is destroyed or sold to charge operating expenses and credit equipment account. When purchasing or rebuilding the cost is charged to equipment account.

Of the total freight earnings of $7,070,150, bituminous coal contributed $4,285,848 as against $3,731,993 last year. General merchandise contributed $1,869,602 as against $1,652,758 last year. Passenger earnings, $1,042,241, increased only $4,000. The expense account, which increased $650,005 as against an increase of $631,121 in earnings, was larger all along the line, especially under the head of conducting transportation. Net earnings per mile ($4,749) are, however, higher than in any previous year except 1904. Both train loading and engine loading show an extremely large increase over any previous year. The average revenue train load in 1905 was 507 tons as against 439 tons in 1904. The average engine load was 374 tons as against 357 tons. This is the largest increase in train load that has been made in any year by the road at any time since 1896, when the train load statistics presented with the current report began.

The following are the principal statistics of the year's operation:

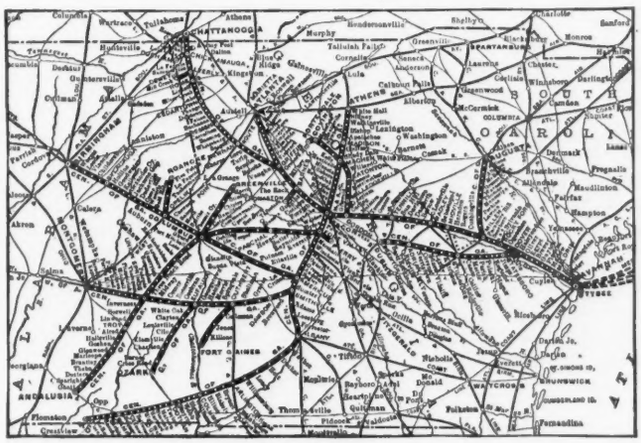
	1905.	1904.
Mileage worked	538	499
Passenger earnings	$1,042,241	$1,038,172
Freight earnings	7,070,150	6,446,366
Total earnings	8,161,079	7,529,958
Maint. way and structure.	676,198	589,412
Maint. of equipment	1,314,407	1,134,748
Cond. transportation	2,898,490	2,516,643
Total expenses	5,058,813	4,408,807
Net earnings	3,102,267	3,121,151

Central of Georgia.

The year ending June 30, 1905, was a prosperous one for this company, formed in 1895 as a combination of six bankrupt properties which had been sold under foreclosure. Gross earnings, which have been increasing rapidly since 1901, passed the ten million mark for the first time in the history of the road, aggregating $10,135,055. The average miles operated aggregated 1,878 as against 1,865 in 1904 and 1,845 in 1903 and 1902; so that with an increase of only 30 miles in line the gain in gross earnings for the last four years has amounted to over 30 per cent. Per mile of line operated the company earned $5,397 in 1905 as against $3,954 as recently as 1900. Operating expenses and taxes this year were $7,417,966 as against 7,187,386 last year, and the total income this year was $2,965,463 as against $2,430,206. Charges on account of equipment trusts, funded debt, rentals and miscellaneous increased in the aggregate less than $9,000, leaving a net income of $854,517, as against $338,467; a sum more than twice as great as the net income in any previous year. The capitalization of the road, dating from the reorganization of the former properties, is an unusual one, since there is only $5,000,000 of stock outstanding, none of which is in the market, but is held by Southern Railway interests. There is no floating debt, and of the total bonded debt of $48,863,000, first, second and third preference income bonds amount to $15,000,000. It is specified that these income bonds, which do not differ much from preferred stock in their earning rights, shall receive not to exceed 5 per cent., non-cumulative. In spite of the small total capitalization, which amounts only to $2,662 per mile, stock, and $26,018, bonds, no dividends have ever been paid on the stock, and the income bonds will this year receive their full 5 per cent. for the first time.

Looking further at the sources of earnings it is seen that considerably the most important increase figured in the percentage of change from the previous year was in the passenger business. In spite of an average decrease of 1.17 cent per passenger mile, passenger train mile earnings increased 8.92 cents, and passenger earnings as a whole increased 11.81 per cent., while freight earnings increased 9.33 per cent. The average revenue train load, which is naturally small on account of the branch line character of much of the traffic, increased from 187 tons to nearly 208 tons. The average haul of revenue tons increased from 142 miles to 148 miles, and ton-mile earnings increased from 1.113 cent to 1.144 cent. The freight traffic, although increased, was carried with a somewhat reduced train mileage, although passenger train mileage increased from 2,758,159 to 2,865,537. As regards specific commodities hauled,

cotton and general merchandise show some little increase, while grain, bituminous coal, lumber and iron fell off somewhat from the year previous, but none of these changes were especially noteworthy. As regards operating cost per mile run, there were considerable increases in the charges for repairs and fuel, slight increases in water supply, oil, tallow and waste, and slight decreases in wages of engineers, firemen and roundhouse men, and in the cost of unclassified supplies.



Central of Georgia.

The following table compares the principal statistics of operation in 1905 and 1904:

	1905.	1904.
Mileage worked	1,878	1,865
Passenger earnings	$2,395,769	$2,164,658
Freight earnings	6,808,639	6,227,550
Total earnings	10,135,055	9,396,931
Maint. way and structure	1,607,530	1,823,517
Maint. of equipment	1,744,226	1,258,597
Cond. transportation.	3,394,369	3,446,866
Total expenses, inc. taxes.	7,417,966	7,187,385
Net earnings	2,717,089	2,209,546

TRADE CATALOGUES.

Dynamos and Motors.—Bulletin 50 of the Northern Electrical Mfg. Co., Madison, Wis., shows "Northern" spherical dynamos and motors. The various styles of machines are illustrated, also their application to industrial plant service, machine shop work, etc. There is considerable helpful information on these subjects in the bulletin. The "Northern" vertical motor, to the development of which the company has given special attention, is illustrated in a variety of applications. Vertical motors overcome the annoyances from bevel or worm gears, turned belts, etc., in operating vertical shafts. The "Northern" is designed to avoid the troubles due to lubrication of the vertical armature shaft.

Dump Cars.—Kilgore-Peteler Company, Minneapolis, Minn., sends catalogue No. 3 on dump cars. Different capacities and gages of Peteler two-way steel-frame dump cars, varying from 1-yd., 18-in. gage, to 6-yd., standard gage, are illustrated and described. Also gable bottom cars for mines, trestle filling and stone quarries; end dump mine cars; flat cars for stone, structural steel, factories, etc.; steel and wood frame lumber cars. The company also makes a large line of special cars which are listed in the catalogue. Wheels and axles are also included in the products of the company. Two illustrations of Kilgore steam shovels loading Peteler cars are included.

Steam Engines.—The B. F. Sturtevant Co., Boston, Mass., has just issued Bulletins 73 and 76, descriptive respectively of its vertical and horizontal center crank engines. Each type is built in a line of about 20 sizes. The horizontal type is entirely enclosed, provided with watershed partition and equipped with forced lubrication. These engines were particularly designed for the direct-connected driving of generators.

Locomotives.—The Baldwin Locomotive Works send two very interesting pamphlets. One of these describes and illustrates the manufacture, the use, and the efficiency of solid forged and rolled steel wheels. The other gives illustrations and general dimensions of heavy locomotives recently made by the company.

Gas Engines and Gas Producers.—The De La Vergne Machine Co., New York, sends an illustrated catalogue of its Koerting four-cycle gas engine. A full detailed description of this engine is given, including cross-sectional line drawings, and half-tone illustrations. The principle of its operation is clearly explained and diagrams showing its efficiency as compared to other types of engines are also given. The latter part of the catalogue contains a description and illustrations of the Koerting suction gas producer as well as a number of valuable engineering tables and data pertaining to both steam and gas plants.

Roofing and Paints.—The Standard Paint Co., New York, is sending out its August issue of "The Exchange." It contains a number of excellent testimonials in regard to this company's P. & B. paints, as well as reports on tests made by Robert W. Hunt & Co., of Chicago, of the National Paint Company's red, olive and green Flexite metal preservative paints and Flexite primer.

Friction Draft Spring.—The Frost Railway Supply Co., Detroit, Mich., has prepared a little pamphlet on the Harvey friction draft spring, for which it is sales agent. This spring was described and illustrated in the *Railroad Gazette* April 7, 1905, and the pamphlet gives much of the information which appeared in that article, also additional facts and claims.

Small Motors.—The Crocker-Wheeler Co., Ampere, N. J., is distributing its latest bulletin No. 60 entitled "Small Motors." It describes and illustrates motors ranging from ¼ h.p. to 3 h.p. The latter pages of the pamphlet contain technical data intended to be valuable to users of electric motors and generators.

Anvils and Vises.—The Eagle Anvil Works, Trenton, N. J., send two folders descriptive of the "Fisher" double screw parallel leg vise and of its "Eagle" anvils.

CONTRIBUTIONS

Railroad Organization.

NEW YORK, August 23, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In view of the interest attaching to the question of organization, will you not elucidate the matter further?

1. Will you please print diagrams illustrating the typical forms of departmental and divisional organizations for a large railroad?

2. Will you please set out in parallel columns the several railroads in this country using respectively these organizations?

3. Is there such a marked inferiority in the operation of the lines using the departmental organization as to justify Mr. Hale's saying?* For many years the Lake Shore was operated on a departmental, and the Fort Wayne on a divisional basis. Will anyone say the operation of the Lake Shore was markedly inferior, or that Mr. Newell permitted any officer of that company to "forget that the object of a railroad is to provide transportation?" For a long time the Chicago & North-Western managed its maintenance on a departmental basis; recently it has been approximating a divisional basis. Can anyone discern improvement in its operation consequent thereon?

4. Will you please set out in parallel columns the merits and defects of the two methods of organization?

5. Will you please say what there is in the peculiarities of organization or in the environment of the systems that determines the owners of the Rock Island to operate their Frisco system on a departmental and their Rock Island on a divisional basis? F.

[The *Railroad Gazette* has devoted considerable attention during the past few years to the study of organization. In 1904, for example, we described the organization of the following roads: Rock Island (departmental), Feb. 19, p. 122; Philadelphia & Reading (divisional), March 11, p. 122; Chicago Great Western (divisional), March 11, p. 173; Boston & Maine (departmental), April 1, p. 253; Buffalo, Rochester & Pittsburg (mixed), April 15, p. 285; Southern Pacific Lines West of El Paso (divisional), June 3, p. 414; Norfolk & Western (divisional), June 3, p. 415; Lancashire & Yorkshire (departmental), June 10, p. 440; Southern Railway (divisional),

*In the *Railroad Gazette*, Aug. 11, p. 122, we quoted the remark of Mr. Arthur Hale, that wherever a department escapes from the hands of the Superintendent it is only too apt to forget that the object of a railroad is to provide transportation: that the engineer will build yards to hold cars instead of to move them, and the master mechanic will think more of his performance sheet than of the amount of tonnage moved.

Sept. 16, p. 348. Following "F's" suggestion, this study will be extended somewhat and within the next few weeks comparisons will be made along the lines suggested by our correspondent. The subject is an important one, and letters to the editor for publication will be welcomed.—EDITOR.]

Philadelphia's Rapid Transit Railroad.

II.

(*Continued from page 157.*)

MARKET STREET ELEVATED ROAD.

The elevated portion of the new rapid transit line which is now building, will extend from the west abutment of the Schuylkill river bridge west on the center line of Market street to the Delaware county line, and then about 690 ft. farther west on private right-of-way to an abutment near the Milbourne Mills, where it comes down to the surface and ends in a terminal yard to be built on a large tract of land owned by the Philadelphia Rapid Transit Co. The total length of the elevated structure will be 19,377 ft., or about 3.67 miles. With the exception of short approach curves at the east and west ends the line is on a tangent and there are no heavy grades other than velocity grades purposely introduced at some of the stations. There will be eight stations, each having platforms and ticket offices on the north and south sides of the structure, connected by a crosswalk suspended under the elevated girders. These stations will be located at the intersections of Market street with the following cross streets: 32d, 36th, 40th, 46th, 52d, 56th, 60th and 63d streets. The surface car tracks will be maintained in their present position in the center of Market street between the elevated columns.

The accompanying drawings show the details of the construction of a typical section of the elevated structure. For about 322 ft. west of the Schuylkill river bridge abutment plate girders will be used for the longitudinal members, the same solid floor construction being preserved as on other sections of the line. From near the county line to the west abutment 680 ft. beyond, an open floor construction will be used, the rails being supported on cross-ties laid on the longitudinal stringers. In designing the structure the main object was to reduce noise and vibration to a minimum, and every member is made heavy and strong with stiff connections to all other members. The ballasted floor will undoubtedly absorb much of the vibration under passing trains and deaden the noise to a great extent. No other structure in use in this country for the operation of electric trains is as heavy and substantial as the one to be built here. Mr. Bion J. Arnold's proposed steel and concrete solid floor structure for the Chicago elevated roads described in the *Railroad Gazette*, April 21, 1905, is perhaps a more substantial and noiseless design, but it has not as yet been tried. With the ballasted floor used, it was, of course, necessary to make careful provision for waterproofing the entire deck and for carrying off such water as would collect from rains and melting snow. These details will be referred to later.

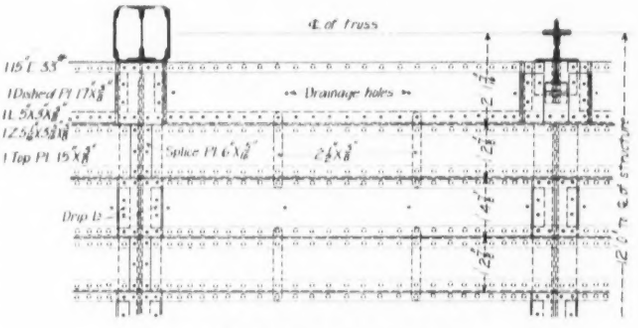
The general design of the structure consists of longitudinal lattice girders 50 ft. long supported on two rows of built-up columns with plate girder floor-beams every 10 ft. carrying a steel trough floor on which the concrete floor and the ballast is laid. The columns are made up of two 15-in., 33-lb. rounded-corner channels, one web plate 14 in. x ⅜ in., and four angles 4 in. x 3½ in. x ⅜ in. The rows of columns are spaced 24 ft. apart, center to center, and the columns in each row are spaced uniformly 50 ft. apart, center to center. The round-cornered channels are placed with the flanges turned in so that the columns have a smooth exterior with no projections.

The lattice girders are 50 ft. long and rest on the column caps which extend up 2 ft. 6 in. below the backs of the top chord angles. The drawings show the material of which the different members are built up and the heavy gusset plate and clipped angle connections used. The light bent angle brackets at the columns add to the longitudinal stiffness of the structure. An interesting detail, not shown on the drawing, is the method of fabricating the bottom chords of the trusses which are made up of two 6-in. x 6-in. x ½-in. angles and double cover plates 14 in. x ⅝ in. The two angles are separated ¾ in. and the space in between is filled to within ½ in. of the top of the angles with cement mortar composed of three parts of sand and one part Portland cement. The remaining ½ in. of depth is filled with Iron Bark cement to keep out water.

The standard depth of the longitudinal girders is 6 ft. 10⅛ in. back to back of flange angles, and the minimum head room between the surface of the pavement and the bottom chord as established by a city ordinance is 14 ft. The girder construction at the stations will be referred to subsequently.

The floor system consists of 34-in. plate girder floor-beams spaced every 10 ft. resting on the inside flange of the bottom chord of the longitudinal girders and riveted to the verticals. At the columns the floor-beams are riveted to the inside channel of the column with connecting angles and further supported by curved brackets made up of a ⅜-in. web plate and light flange angles. The steel trough floor rests on the top flange of the floor-beams. It is made up of 15-in. x ⅜-in. top plates, ⅜-in. Z-bars and special dished plates for the bottoms of the troughs. The enlarged detail shows the method of lapping the joints to make them waterproof. At intervals of about 3 ft. holes 1¼ in. in diameter are punched in the dished plates with a projecting lip on the under side to drain off any water that may percolate through the concrete floor. The projecting lip on the holes forms a drip for the water and prevents it from running along on the under side of the troughs and injuring the paint on the steelwork. At the junction of the dished plates with the floor-beams short lengths of light angle iron are riveted on the under side of the top flange of the floor-beam to act as drips for any water which may leak through. Water dropping off of these angles will clear the bottom flange and will not run down the web plate or across the flanges to the columns. A detail of this is shown on the drawings.

The trough floor is covered entirely over with concrete having a minimum thickness over the top plates of 4 in. This concrete floor slopes 3 per cent. from the sides to a gutter in the center running the length of the structure. Where the structure is on a grade of 1 per cent. or more, this gutter is given the same grade as the track, but where the structure has a grade of less than 1 per cent., the gutter is given a grade of at least 1 per cent. by local inclination between the column bents. At each column bent the water collected by the gutter is led by a pipe through the floor to a light channel which carries it down and out to a collector fastened to the column from which a down spout leads to the pavement. The concrete is retained at the sides by a 15-in., 33-lb. fascia channel, the top flange of which forms a metal finish and prevents the thin wall from being cracked or broken. To hold the concrete against the vertical surface stud bolts wrapped with wire



Part Plan of Steel Trough Floor.

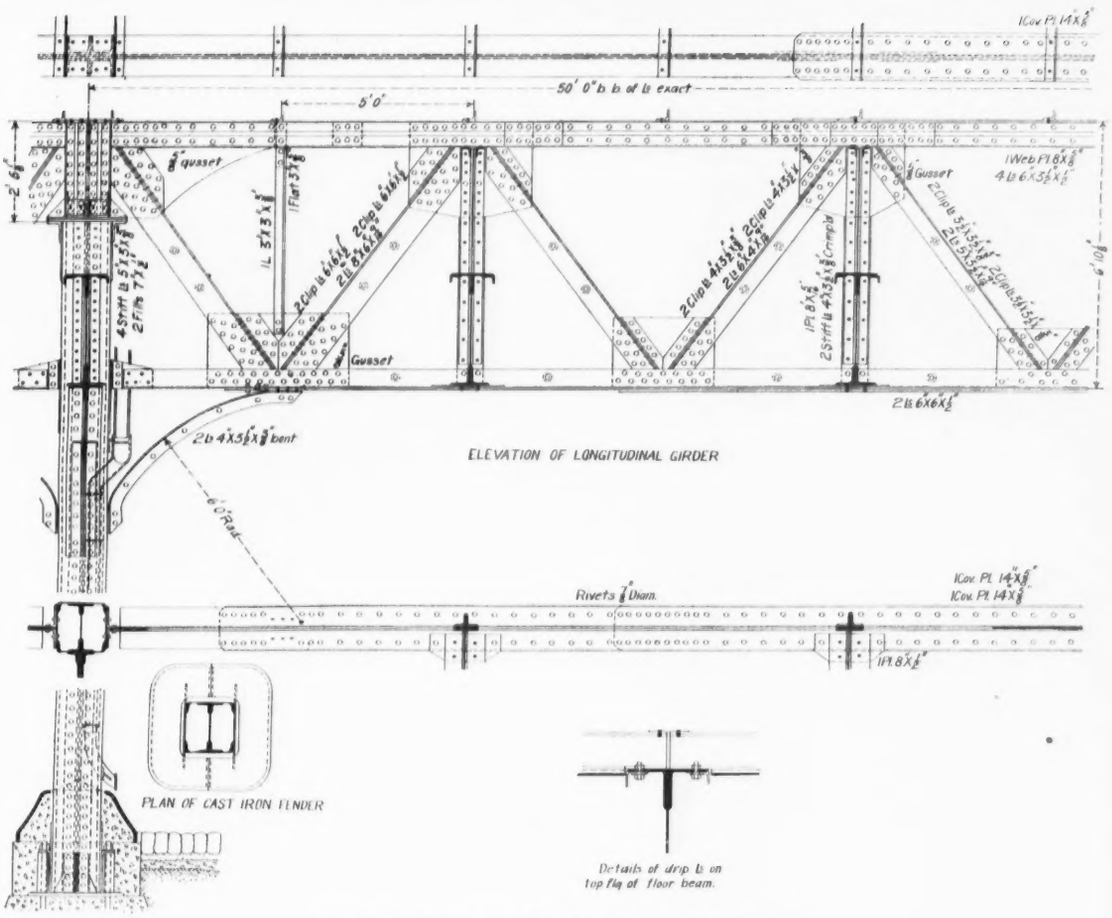
are inserted in the web of the channel at frequent intervals and the concrete surrounds their projecting ends. Steel wire cloth reinforcement is also laid across the entire width of the concrete floor. At the expansion joints which are spaced 150 to 200 ft. apart the concrete is confined by steel plate dams and the wire-wrapped stud bolts are used on these vertical surfaces also. The ballast under each track is held in place transversely by the concrete wall next to the fascia channels and by a low wall next to the central gutter. Where the track is on a 2 per cent. grade or more, transverse ridges are formed in the concrete bed to prevent creeping of the ballast. The top of the concrete bed is given a granolithic finish 1 in. thick, well trowelled, and the stone ballast is laid on this without other waterproofing. A minimum depth of ballast of 5 in. has been specified to prevent any injury to the top surface of the concrete when tamping.

A plank floor gangway is carried along each side of the structure about 2 ft. above the level of the rails. It is supported on curved angle brackets attached on the outside of the longitudinal trusses opposite the floor-beams. The inner edge rests on the top chord of the trusses. For protection a pipe railing is added and particular attention has been paid to the design of all the connections for this railing to prevent any joints from getting loose and rattling. The drawings also show a trolley pole supported on a heavy bracket riveted to the columns. This will be omitted on the structure for the present and power will be supplied to the trains from third rails mounted between the tracks. The feed cables will be carried under the trough floor and will be connected to the third rails with feeder wires running up through pipes set in the concrete floor.

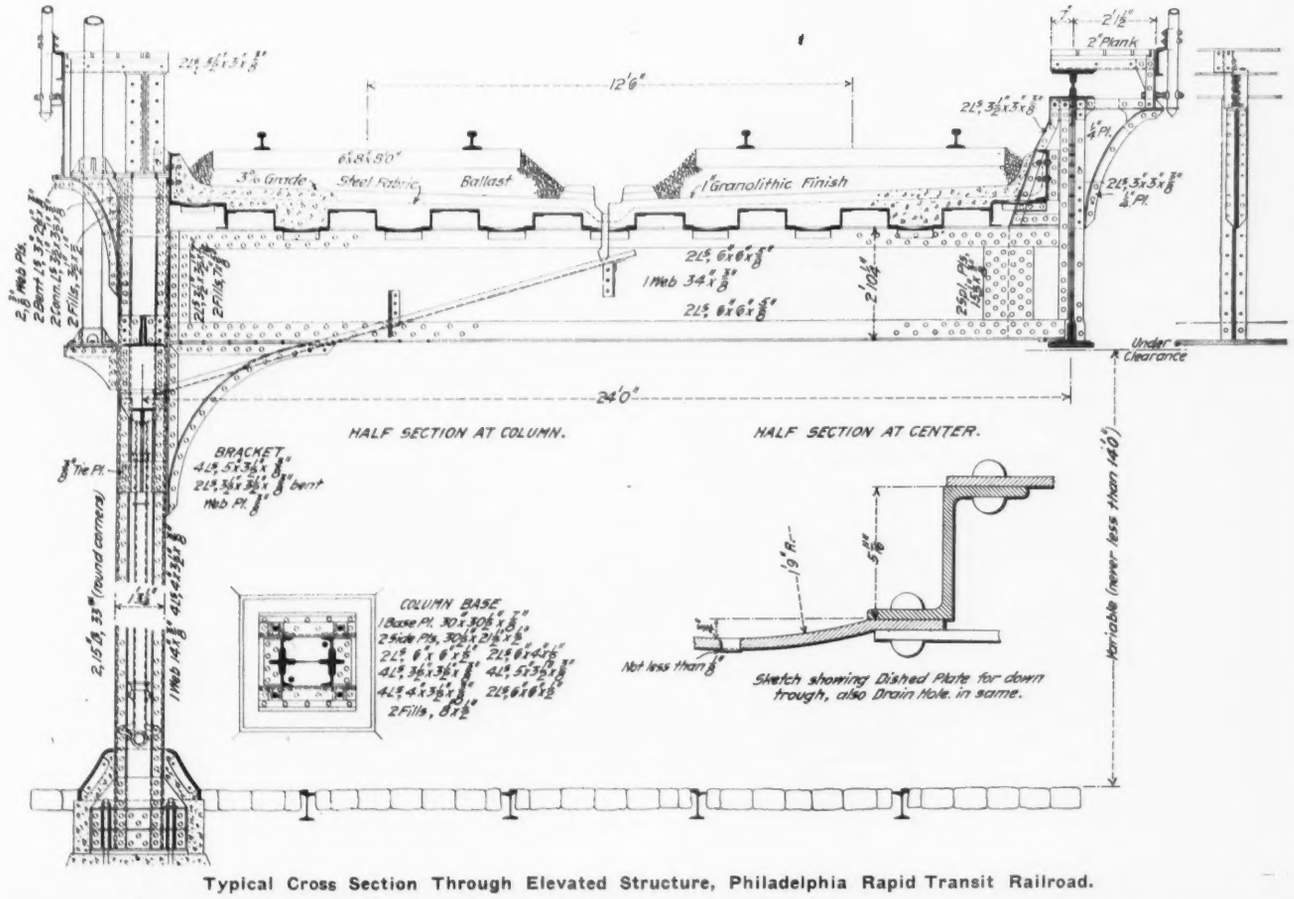
The specifications covering the painting of the steel work contain a number of novel clauses. They are reprinted here almost in full.

The paint to be used on the structure, both at the shops and in the field, shall be as designated by the chief engineer.

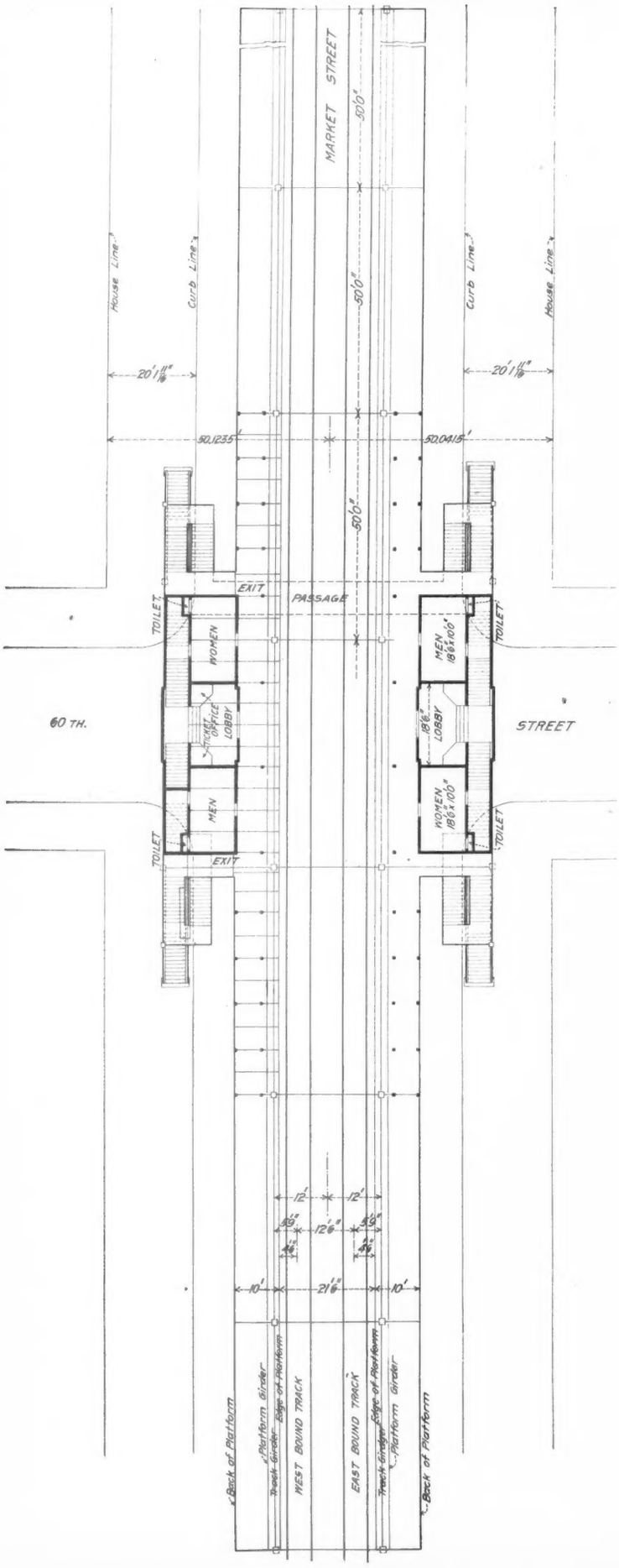
It is to be understood that the requirements for workmanship for the painting at the shops and in the field, will be strictly enforced, and the contractor shall give such detailed instructions as

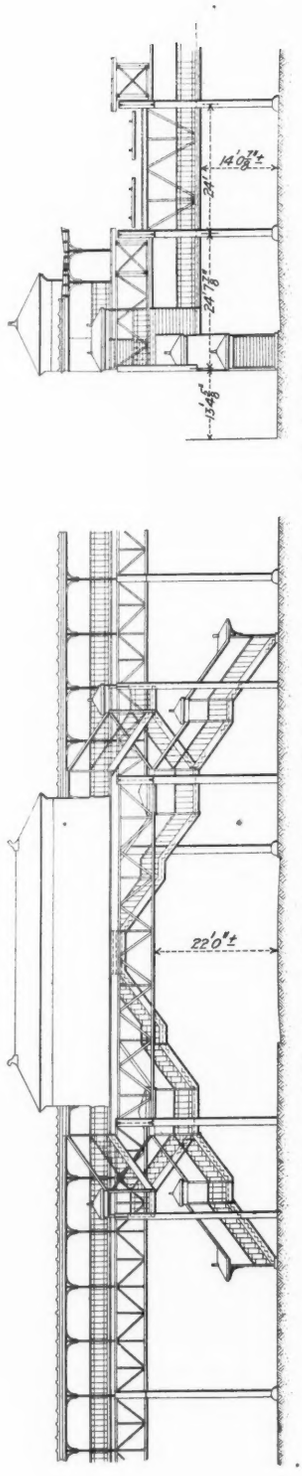

50' 0" b. b. of Ls exact
5'0"
ELEVATION OF LONGITUDINAL GIRDER
Rivets ⅞" Diam.
PLAN OF CAST IRON FENDER
Details of drip ℓs on top flg of floor beam.

Elevation of Typical Longitudinal Lattice Truss.



Typical Cross Section Through Elevated Structure, Philadelphia Rapid Transit Railroad.





Plan and Elevations of Typical Elevated Railroad Station at 60th and Market Streets.

are required to facilitate procuring the high grade of work prescribed. The prohibition of painting during wet weather on wet surfaces, and during freezing weather, may entail protracted periods after erection, during which painting will be suspended. The contractor is hereby required to take cognizance of such probable delays and make all necessary allowances therefor.

When the general painting is suspended, field rivet heads, the heads of nuts or bolts, or any parts of the structure, where the paint may have become abraded or damaged, during erection or during transit, shall be touched up to cover, so that none of the structure shall become rusty. In all cases where painting is resumed after suspension, all rust which may have accumulated, shall be thoroughly cleaned off before any paint is applied.

Proprietary paints shall be brought to the shop and site in the original packages, unopened, and shall not be adulterated by the addition of any substance whatever. Should any thinning be necessary, it shall only be done with materials supplied, or approved by the manufacturers of the respective paints, and shall be used in accordance with their directions. The packages shall not be opened or used until they have passed examination and been marked by the inspector.

Material received at the shops, and which is not immediately used, shall be protected from rusting. In the case of plates they may be piled, the top and bottom plates and the edges of all the plates to be oiled with pure raw linseed oil.

Before leaving the shop the work shall be thoroughly cleaned from dirt, loose scale, rust, machine oil or other adhering substances by the use of steel brushes, steel scrapers, sandpaper, and other tools or appliances, as may be necessary to thoroughly clean the surface, said cleaning to closely precede the painting, and be subject to the approval of the inspector.

After cleaning, the work shall receive one thorough coat of the prescribed paint, thoroughly applied and well brushed out by skilled workmen, medium sized, round bristle brushes to be used, and the work subject to the oversight and approval of the inspector.

The painting shall be done under cover, and no painting shall be done after loading on cars, nor when the work is exposed to freezing weather, nor unless the metal is perfectly dry.

All surfaces of metal work which are bolted or riveted together to remain permanently in contact, shall receive one thorough coat of paint before being put together. After the shop coat is applied, the metal shall be protected from the weather until the paint is dry.

No metal shall be shipped until the inspector has pronounced the paint sufficiently dry, and care shall be exercised in handling or temporary storing to keep wet paint free from dirt, and in handling and loading, to keep painted surfaces from contact, by using proper packing pieces between them.

After erection all metal shall receive two coats of paint, to be designated by the chief engineer, each coat to be of different tint, so as to be readily distinguishable. Surfaces that will be inaccessible after erection shall be painted before being placed in position. Care shall be taken to work the paint into all crevices, corners, etc. All recesses which would retain water or through which water could enter must be filled with Iron Bark cement manufactured by Edward Smith & Co., of New York, before receiving the final painting. Certain apertures shall be filled with Portland cement mortar, covered with the said compound, as shown in the drawings. The Iron Bark cement shall be heated in a suitable vessel, and poured by means of a spout into the apertures, and shall not be smeared or spilled over the work. All surfaces so close together as to prevent the insertion of paint brushes must be painted thoroughly by using a piece of cloth instead of a brush.

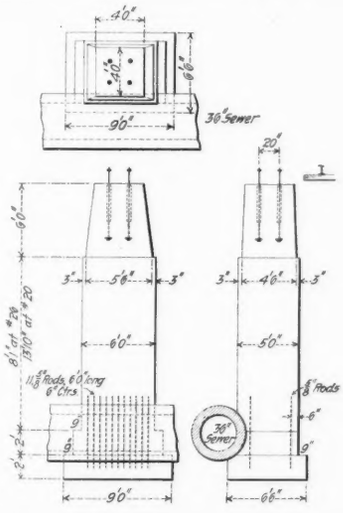
Before any field painting is done, the work shall be thoroughly cleaned in advance of the application of any field paint.

The heads of rivets driven in the field, and the heads and nuts of all bolts shall receive a coat of paint in advance of the two general coats after thorough cleaning.

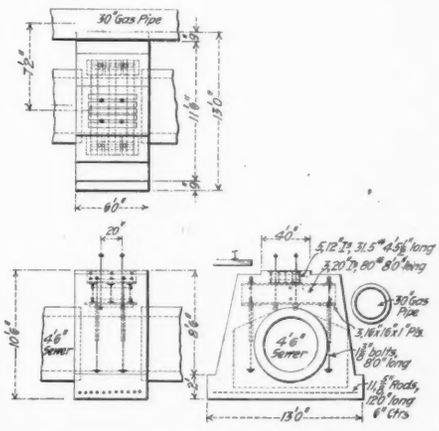
All of the shop painting which may receive damage during transit or erection shall be properly cleaned and painted in advance of the application of the two general coats. Under no circumstances shall any of the painting be done in wet weather or over any wet surfaces, nor during freezing weather.

All work damaged during or after painting shall be repainted with the same precautions as are required in the specifications for the original work.

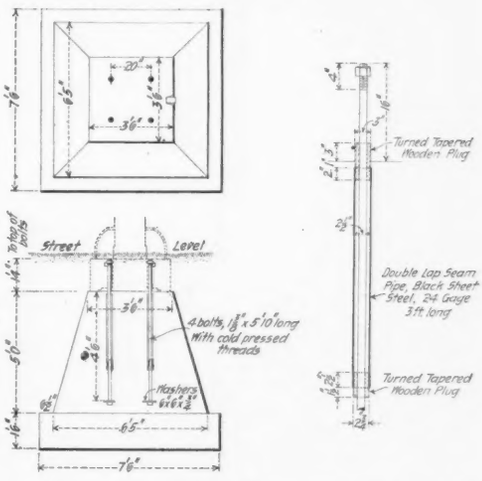
The eight stations on the elevated line are all essentially alike, and the drawings herewith of the station at 60th street show the principal dimensions and arrangement. Wherever possible the grades on the elevated structure on each side of the station have been adjusted so as to provide an accelerating and retarding grade at the station for both eastbound and westbound trains. In order to preserve the minimum head room of 14 ft. under the floor of the cross-passages the platforms are necessarily raised higher than the level of the larger part of the structure. The longitudinal trusses under the stations have been made deeper therefore, in some cases having a depth of 20 ft. This has been done to give additional stiffness and strength to the structure at the point of greatest strain due to the stopping and starting of trains. Where the deep trusses are used, latticed floor-beams have been substituted for the standard 34-in. plate girders to give additional transverse stiffness.



Deep Foundation Over 36-in Sewer.



Foundation with I-Beam Grillage Over 54-in. Sewer.


Street Level
4 bolts, 1 1/8" x 5'10" long with cold pressed threads
Washers 6"x6"x 3/8"
6'5"
7'6"
Turned Tapered Wooden Plug
Double Lap Seam Pipe, Black Sheet Steel, 24 Gauge 3 ft. long

Standard Foundation and Detail of Anchor Bolt Casing.

The general arrangement of the stations at the track level, the stairways and cross-passages are shown in drawings. The platforms are 350 ft. long and 10 ft. wide, and will accommodate seven-car trains. Each platform has two stairways leading to the street. The entrance to the stairways is from the sidewalk of Market street and the first two flights lead to a landing at the level of the cross-passages. The stairway directly ahead leads to the ticket office on the level of the platform and the other stairway is for the exit of passengers. The two entrance stairways open into the central lobby of the station building and at the top are flanked by ticket offices. On the right of this lobby is a men's waiting room 18 ft. 6 in. x 10 ft., with toilet room opening off, and on the left is a similar room for women. The platforms are covered with an inverted V roof shed for their entire length, the roof being supported by two rows of columns as shown in the cross-section.

The station building is supported on a deep longitudinal lattice girder resting on two columns 62 ft. 9⅛ in. apart, center to center, 24 ft. out from the main columns of the elevated structure. Lattice floor-beams connect this longitudinal girder with the track girders. The platforms beyond the station building are carried on separate girders supported on brackets riveted to the outside of the main columns to avoid vibration.

The foundations for the columns of the elevated structure presented many varied and difficult problems. West Market street, like most city streets, is underlaid with a network of conduits, sewers, gas and water pipes, and where these interfered with placing the foundations it would have been a tedious and expensive job to take them up and relocate them elsewhere in the street. There were encountered, also, many different kinds of subsoil, some of which made unstable bearings for foundations. The problem was very carefully worked out from data secured from a number of sources before actual work was begun in placing any concrete. For

a number of years the Board of Highway Supervisors of Philadelphia has been gathering data and carefully mapping the location of the sub-surface structures under the city streets, and this data was of great value in designing the foundations. The company also excavated in places and took numerous borings to ascertain the nature of the soil under the pavement and the location of obscure pipes, etc. Three examples of standard and special foundations are shown in the accompanying drawings. The standard foundation shown is for good bearing ground holding about 2½ tons per square foot. It is built of concrete with a square base 7 ft. 6 in. x 7 ft. 6 in. The top is 3 ft. 6 in. x 3 ft. 6 in., and is about 20 in. below the surface of the pavement. Four anchor bolts 1⅜ in. in diameter are bedded in the concrete 20 in. center to center in each direction. At the bottoms of the bolts 6-in. x 6-in. x ¾-in. washers are placed above the nuts. To provide for slight inaccuracies in the location of the bolts they are encased for the upper 3 ft. of their length by 2½-in. double lap seam pipe. The bottom of the pipe is closed with tapered wooden plug and the top is closed with a similar plug which can be removed when the column bases are placed and the pipe filled with cement mortar.

One of the drawings shows a deep foundation built around a 36-in. sewer which was under the row of columns. The footing is carried below the bottom of the sewer and the shaft is built up around the side of it with reinforcing rods to compensate for the eccentric loading. The upper portion of the foundation is very similar to the standard design.

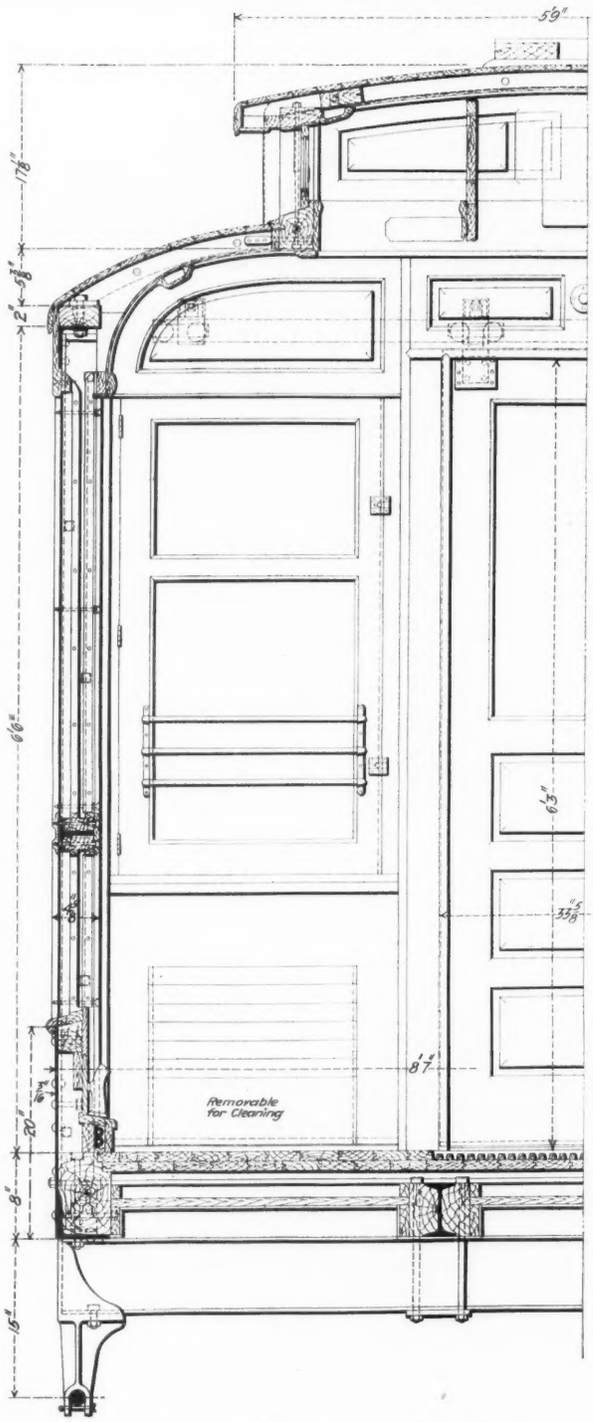
Still another method of building a foundation over a 54-in. sewer directly under the center of the columns and quite close to the surface is shown in the third drawing. In this case the sewer was completely surrounded with concrete walls. A double grillage of I-beams was used to transmit the load from the center to the side walls and thence to the footing below.

The proportions of the concrete used for the foundations were 100 lbs. of Portland cement, 3 cu. ft. of fine gravel, coarse sand or stone grit, and 6 cu. ft. of crushed stone. It was mostly machine mixed and placed fairly wet. The tops of the piers were all trowelled to a smooth surface for a bearing for the column bases. Work on the foundations was begun early this year and is now practically completed. As each pier was finished it was back filled and the street pavement replaced so that traffic has not been greatly disturbed. As the erection of the steelwork progresses the foundations will be uncovered only far enough ahead so as not to delay the placing of the columns. When the columns are placed and bolted down with the anchor bolts, the bases will be surrounded with concrete and the cast-iron fenders put on. These are made with openings in the top so that they may be filled with cement mortar after being adjusted to their proper position.

The rolling stock for the Philadelphia Elevated will be very similar to the latest design on the Boston Elevated. The cars will have side doors and wide end platforms with the end bulkhead of the car omitted. The Sprague-General Electric system of multiple-unit control with automatic accelerator will be used. No provision has been made for an express service; all trains will be run as locals, making all stops at stations.

The American Bridge Company has the contract for the fabrication and erection of the steel work, and some of the material is now being shipped but as yet none has been erected.

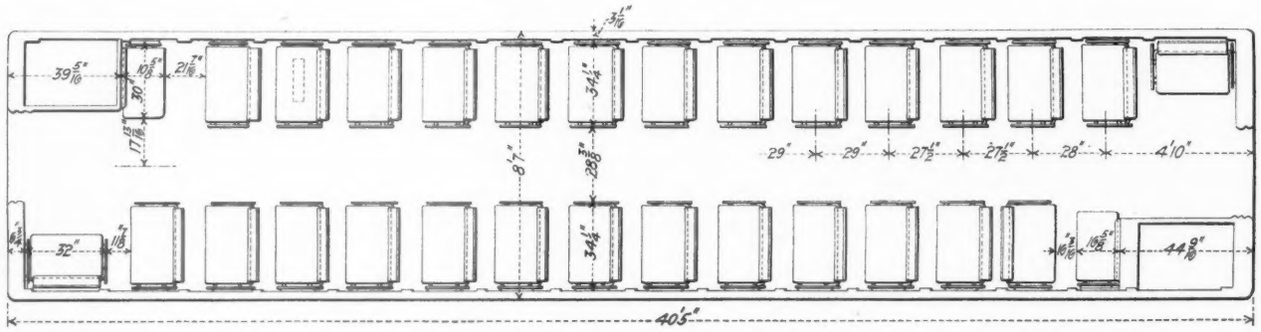
For the information contained in this article as well as in the previous article on the Subway section we are indebted to Mr. William S. Twining, Chief Engineer of the Philadelphia Rapid Transit Company, and to Mr. Charles M. Mills, Principal Assistant Engineer in charge.



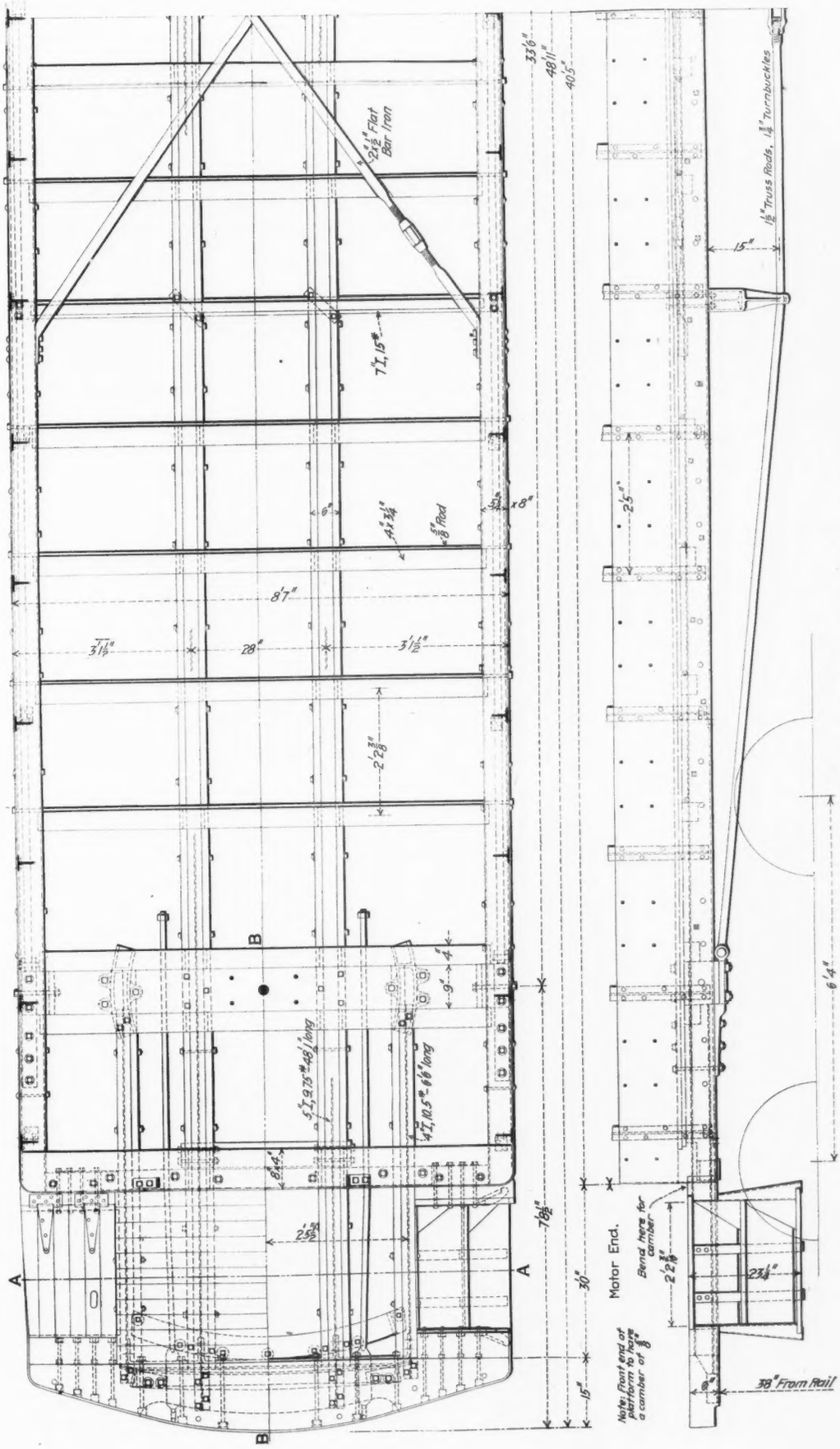
Half-Cross Section B. R. T. Convertible Motor Car.

Convertible Electric Motor Cars—Brooklyn Heights Railroad.

The Brooklyn Heights Railroad Company will shortly put in service 100 of its 1905-type convertible electric motor cars. The order for these cars was divided as follows: The Cincinnati Car Co., Cincinnati, Ohio, 50; the Jewett Car Co., Newark, Ohio, 25, and the Laconia Car Works, Boston, Mass., 25. These cars are some-



Seating Plan of B. R. T. Convertible Motor Car.

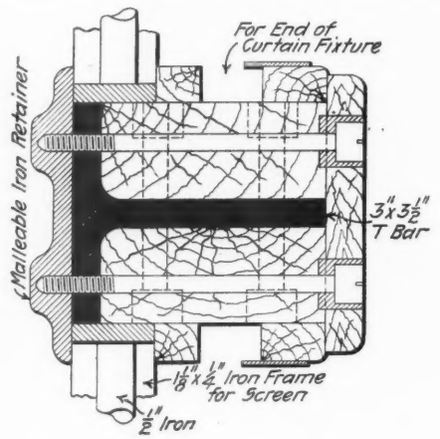


Bottom Framing Plan—B. R. T. Convertible "L" Motor Car.

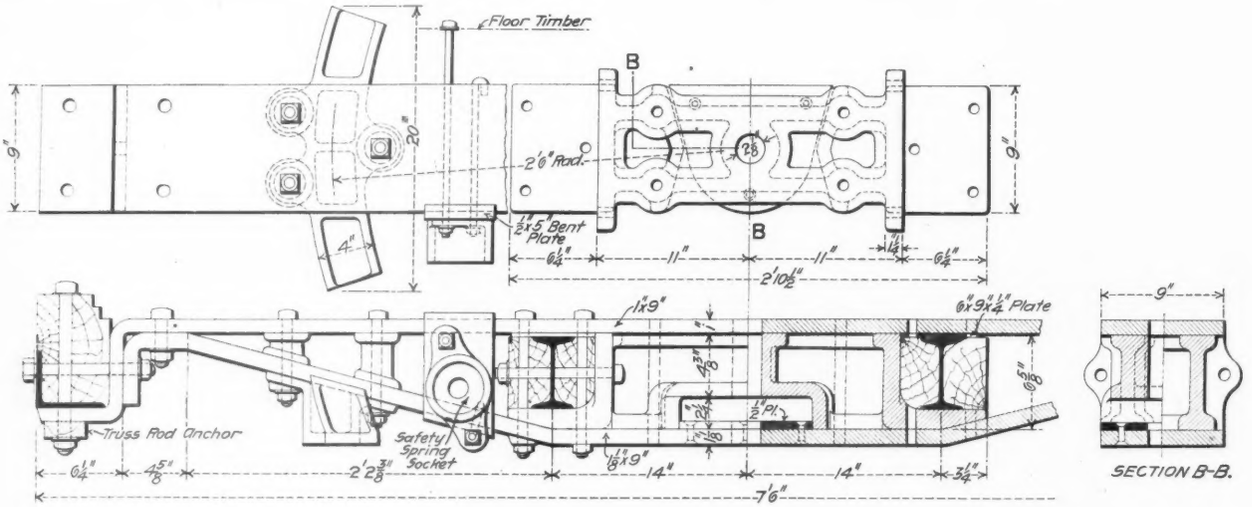
what similar to the open cars which the Brooklyn Heights Railroad Co. designed in 1903, and which were described in the *Railroad Gazette* July 3, 1903. It is claimed that this 1905 type is more nearly a convertible car and will meet the conditions in winter as well as in summer to better advantage than the 1903 type. The new cars have center aisles and are provided with comfortable, spring rattan-covered cushion, cross-seats; are well ventilated with the company's standard type of monitor roof, are well lighted, and all details as to strength and stability, as well as comfort of passengers, have been carefully worked out. They are built with steel underframes sheathed with wood filling pieces.

The center sills are 5-in. I beams with wood fillers and extend to the platform and sill. The two side sills are of 4-in. x 5-in. x ⅜-in. angles and extend only to the car body and sill. In addition to the center and side sills a steel side plate 20 in. x $^{3}/_{16}$ in., which extends the entire length of the car body, is bolted to the side sills. Yellow pine floor beams 3¼ in. x 4 in. spaced at about 2 ft. 3 in. centers are supported at each end on angles riveted inside of the side sills. The bottom frame is strongly braced diagonally by 2-in. x ½-in. flat iron bars. These bars are tightened by sleve nuts secured to their ends, as shown in the illustration. The side posts are of 3-in. x 3½-in. steel T bars, and are spaced 29 in. apart center to center. The 3-in. sides of these posts are securely riveted to the bottom side plate of the bottom framing and to the angle along the top of the body plate. The bolster is made as shown in the detail illustration and is provided with a cast-steel center casting and cast-steel side bearings. The safety chain is connected to a safety chain rod which passes through the bolster and to the end of the rod is secured a 3½-in. x 6-in. coil spring which rests in the safety spring socket which is secured to the bolster as shown.

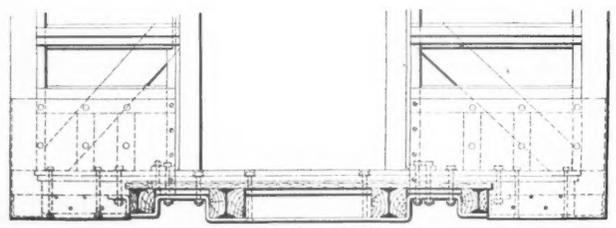
The roof is of the monitor type; it is of tongued and grooved white wood and is covered with a single piece of No. 6 cotton duck. The roof framing is made up of steel and wooden carlines. There

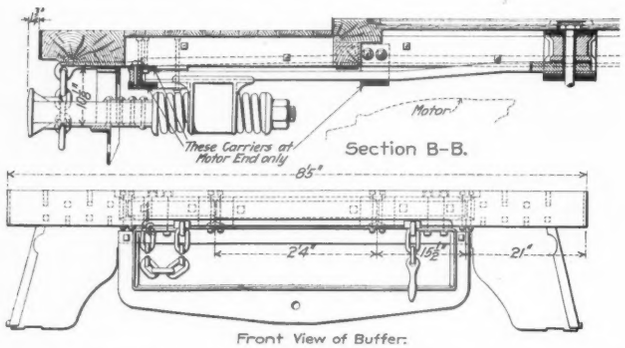


Detail of Window Posts.

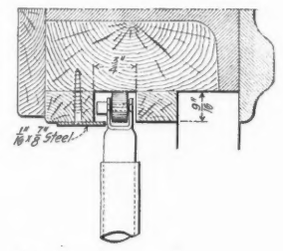


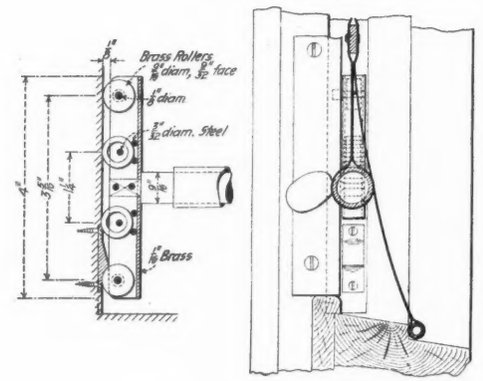
Details of Bolster—Convertible Motor Car.





Section Through Bottom Floor Framing—B. R. T. Convertible Motor Car.





Detail of Curtain Fixture.

is a copper gutter over the front and at each side of each hood and over each motorman's cab window to prevent water from dropping off the roof on the cab windows or on passengers going from car to car. The floor is of Southern pine, 1¼ in. thick, tongued and grooved and laid longitudinally with two trap doors at the motor end of the car. The false floor is of 3½-in. x ¾-in. square-edge maple. The under side of this floor is protected by a layer of transite ¼ in. thick.

The platforms are supported on the two 5-in. I-beam center sills which extend to the outer edge of the platform end sills, and by two platform sills, each formed of one 4-in. I-beam, with wood filler, running from the platform end sill to the bolster. The platform end sill is of white oak 14½ in. wide x 6 in. thick. The platform flooring is of comb-grained Southern pine 1 in. thick x 3½ in. wide, with square edges. Steps at each side of each platform and trap doors covering the steps, with a rubber bumper on the car body and a brass catch to hold the trap doors up are provided. Each platform is equipped with two Pitt gates and one of the company's standard lattice safety gates.

For summer service the sides of the cars are left entirely open except for the side posts and the movable side screen frames. These frames consist of a ¼-in. x 1⅛-in. wrought iron frame 25 in. wide by 3 ft. 8 in. high, having six ½-in. iron rods placed horizontally at about 7 in. centers. In winter these frames are taken out and replaced by side sashes. The side sashes, as well as the side screens, are held in place by malleable iron retainers secured to the side post by bolts, as shown in the detailed illustration. In winter ample ventilation is secured by the side and end ventilators.

The inside finish of the car is of cherry in natural color and the headlining is of three-ply hard wood aggregating about ¼ in. in thickness. The side curtains are all equipped with a specially designed curtain fixture, a detailed drawing of which is shown. The projecting lug and the retaining strip make it impossible for a passenger to dislodge the bottom part of the fixture from its runners.

The total seating capacity of each car is 60 and each car is equipped with two special B. R. T. car heaters, one on either side the motorman's cab, and 24 Consolidated No. 192 single coil heaters. The cars will be lighted by 25, 16-c.p. lamps. There are seven lights in the clerestory and seven beneath the lower deck, as well as four on the two platforms. These latter are controlled by switches, so that they can be thrown to the marker lights, or the markers cut out and the platforms lighted. Peckham No. 40 motor trucks are used under the cars, this type having been adopted some time ago as standard on the Brooklyn elevated lines. The motors are of the Westinghouse 50-L type of 150 h.p. each. Two motors are used. Both are mounted upon one truck at one end of each car, thus making two driving axles per car and on the same truck. The Westinghouse electro-pneumatic, multiple-unit control is used. The air brake equipment consists of the regular standard New York 10-in. cylinders with quick action triple valve and special "Brooklyn Heights" motorman's valve and Westinghouse Traction Brake Company's No. D—2 E G compressors and governors.

Some of the general dimensions of the car are as follows:

Length over platforms	48 ft. 11 in.
" over end sheathing	40 " 5 "
" between centers of trucks	33 " 6 "
" from center of truck to end of platform	7 " 8½ "
" from end of body to end of platform	4 " 3 "
Width over sills (about)	8 " 6 "
" over sheathing	8 " 7 "
" over drip rails	8 " 9½ "
Height, bottom of sill to top of rail	9 " 2½ "
" rail to bottom of sill	3 " 1½ "
" rail to top of roof	12 " 4 "
Truck, wheel base	6 " 4 "
" total wheel base	39 " 10 "
" diameter of wheels	33 "

The cars were designed by the railroad company, and we are indebted to its Mechanical Engineer, Mr. R. C. Taylor, for the drawings and information.

The Cost of Locomotive Operation.

X.

BY GEORGE R. HENDERSON.

(*Continued from page* 134.)

WASTE.

This is the smallest item of those accounts regularly kept by railroads; in fact, it is so insignificant that it is now usually classed under the general head, "lubrication" or "oil and waste." Notwithstanding, it is a subject of considerable importance in its proper application and use, as the liability of hot boxes and consequent train delays depends very materially upon the kind of waste used and the method employed in packing the cellars. Very often a freshly packed box will not run as cool as one that has been running for several days, and a good rule is to leave it alone until it shows signs of heating. The proper amount of inspection to determine that the waste is sufficiently oily and that it is in contact with the journal is, of course, perfectly proper, but if the packing is in good shape it had better not be disturbed. The driving boxes of a high-speed locomotive are extremely sensitive, and while some will run for months without giving any trouble, others cause annoyance continuously. This is ordinarily due to some defect in material or finish, but it is often very hard to remedy.

Quality.—There are nearly as many kinds of waste as lubricants, and they are sold at as many prices. Ordinary cotton waste is perhaps the cheapest, costing 3 or 4 cents a pound. Wool waste is more expensive by 50 or 100 per cent., and there are places where one will not answer for the other. For instance, wool waste should be used in driving box cellars, as its elasticity keeps it against the journal, where ordinary cotton waste lies "soggy" in the bottom. Steel wires are sometimes mixed with waste to give it life, and help to maintain it in contact with the journal; in other cases hair is used, also asbestos fibres. Certain patented packings cost as much as 12 cents a pound, and may or may not be worth the price, depending upon the general results obtained.

Wool waste is not suitable for the tops of driving and truck boxes, where cotton waste, on account of its "deadness," lies on the box and prevents the dust and dirt penetrating to the bearing, while not interfering with the application of oil, as it holds it and permits it to percolate through the waste to the cavities, and so to the bearing. Where grease is used, however, waste is not needed, as the former has ample body, and it is held against the revolving parts by pressure, either by a screw plug, as in rod cups, or by springs when used in driving boxes.

Waste used in cellars and journal boxes should be thoroughly soaked in oil and the surplus allowed to drain off before it is used as packing, and the proper knives, etc., are needed to apply it to the journal. This is fully as important as the question of quality, and the service obtained depends upon the faithful performance of this work.

Waste used for wiping parts of engines may be the cheapest kind of cotton waste—in some places rags are used for this purpose, and probably quite as satisfactorily, as nearly any soft material will answer for this work.

Quantity.—After the boxes have been properly packed the amount required for regular maintenance is small, and the best way is probably to include it, as far as cost is concerned, under the general head of "oil and waste." From a report of the Chicago & North-Western Railway, rendered when the oil and waste were charged separately, the cost varied on different divisions from 1-10 to ¼ that of oil, the average for the whole road being 1-7; that is, where the oil cost $2.10 per 1,000 engine-miles, the waste amounted only to 30 cents for the same distance. The oil and waste should ordinarily vary proportionately for engines of different size, so that if we take the waste at one-seventh of the cost of oil, we cannot be very far from the truth. With grease so little waste would be needed that it may be omitted. We should then obtain the total cost of oil and waste per 1,000 engine-miles approximately as below:

Engine.	Service.	Cyl. diam.	With waste.	With grease.
Simple	Passenger	17 or 18 in.	$1.50	$0.85
"	Freight	17 " 18 "	1.88	1.12
"	Passenger	19 " 20 "	1.90	1.08
"	Freight	19 " 20 "	2.36	1.41
"	Passenger	21 " 22 "	2.54	1.45
"	Freight	21 " 22 "	3.06	1.84
Compound	Passenger	16 and 26 "	2.08	1.18
"	Freight	16 " 26 "	2.50	1.49
"	Passenger	17 " 28 "	2.54	1.45
"	Freight	17 " 28 "	3.06	1.84

These figures compare tolerably well with practice. In November, 1899, the average cost of oil and waste per thousand miles was $2.40 on the Chicago & North-Western, no engines having larger than 20-inch cylinders. In February, 1903, the Lake Shore averaged $2.90 for freight and $3.20 for passenger engines. This road has some very powerful passenger locomotives, and that these have put up the cost is evident from the fact that the year previous the same item amounted only to $2.70. For the years 1901 and 1902 the Santa Fe figures were $2.29 and $2.40, all classes of service averaged, a number of heavier locomotives having been added during this time.

While the cost of lubrication naturally increases with the size of the engine, it must be remembered that more work is done, and when reduced to a ton-mile basis, upon which profits are figured, the results may look very different. Thus for a main line and a branch division of the Santa Fe during January, 1903, with average tons back of engine of 702 and 416, respectively, the cost of oil and waste per 1,000 engine-miles was $2.80 and $2.40, but the cost per 1,000 ton-miles was .40 and .58 cents. Here we find an increase of the main line over the branch engines of 16 per cent. *per engine-mile*, but a decrease of 30 per cent. *per ton-mile*, which is certainly the most accurate basis of comparison of the two.

As above stated, we cannot take these figures for oil and waste as accurate for any particular road, as there is always a great variation between the highest and lowest figures; but in estimating the comparative cost of operation of various sizes of locomotives they should represent the facts close enough for general purposes. If the cost or quality of the oil is different from what we have assumed, the final figures would need adjustment, but most roads are now using the same kind of oil on locomotive equipment through-

out the country, so that there should be little need of modification in the values given.

Many roads keep an account of the cost of lubrication by individual enginemen, and if one is extravagant he is asked to explain the reason. A new box, or refitted rod, is often a cause for increase in lubrication, but it should average up for the same service in one or two months.

TOOLS.

The tools usually supplied to locomotives include not only hammer, wrenches and chisels, but the various assortment of oil cans, lanterns, signals, scoops, firing bars, torches, etc. While not strictly tools, they are included under this general designation. After the engine is once equipped, the cost of maintenance should be very small indeed, but in reality it is often quite large, and the amount does not bear any relation to the size of the engine, but rather to the disposition of the men upon the engine.

It is important, in the first place, that the tools should be made of the proper material. Perhaps the greatest wear comes upon the scoop or coal shovel. Some roads have specifications for these scoops, defining the weight, size and quality of material to be used, actually designating the chemical composition of the steel of which the scoop is made, and the method of riveting it to the handle. While these scoops do not cost very much, on account of the large number used, it is important to see that they are not maltreated. For this reason it is customary, when a fireman needs a new one, to make him bring in the old one as evidence that it has not been ruthlessly destroyed. Before this was done, it was quite common for the shovels to disappear altogether—they would either go into the firebox (of course, accidentally!) or land in the ditch alongside of the track. The oil cans are apt to be very short lived, unless made of heavy material. One and two-gallon tin supply cans are of little service, as the necks get broken off and the sides knocked in with very short service. This can be improved by the use of sheet steel cans, which are now placed upon the market. Sometimes torches are given out at a surprising rate. The writer recollects one case where the company had adopted a new pattern, which took the fancy of the men so quickly that the old models were thrown into the ditch or broken intentionally, so that the new style might be obtained.

Marker lamps are often damaged by being used as a foot-step in reaching the headlight, and it seems like a business proposition to make everything about a locomotive strong enough for a man to stand upon.

One road furnished each locomotive with expensive traversing jacks, that is, a screw jack mounted on a base upon which it could be moved by means of a screw and ratchet. They were so seldom used that they were generally rusty and inoperative, and cost a considerable sum to put them in order at frequent intervals.

The small tools should be kept locked up in metal boxes upon the tender, or turned in after each trip to the care of an attendant. Some roads check up the tools turned in after each trip, and if any are short or broken hold the engineer to account for same. This encourages care on the part of the engineman, and reduces materially the cost of such supplies, but on the other hand, it means an outlay for the wages of such inspectors. Where engines are assigned to one or two crews, there is generally little trouble about loss of tools, unless they are actually stolen from the box. This is not an uncommon feature. An official of the Pennsylvania, while traveling in Ireland, is said to have met a man one night carrying a lantern on which were moulded the letters P. R. R., indicating that the bearer was a "Pretty Rough Rascal" in actuality.

Where pooling exists, it is very necessary to keep strict watch over the engine tools, as they will be distributed about the road regardless, and engines will go out without the proper equipment, and in case of trouble much delay and inconvenience will ensue.

As may be surmised from the foregoing, it would be impossible to give a figure for the maintenance of locomotive tools that would have anything like a general application. It will vary more with the section of the country and the type of men employed than with the size or style of the engine. When the men are naturally careful, the cost should be insignificant. Where they are unruly and careless, the figures may run quite high. One road kept account of the supplies furnished to the individual enginemen, and prepared a statement each month, giving the expense in this line by each man. In those cases where the withdrawals seemed excessive or above the average he was asked to explain and improve his methods. It is only by constant surveillance that these costs can be kept down to a reasonable figure, and this requires eternal vigilance.

As it is customary to include tools and miscellaneous supplies under one head in the accounts of railroads, the actual cost to be allowed will be worked up together with the items included under the next heading.

MISCELLANEOUS.

The miscellaneous supplies ordinarily include the various tools which we have just discussed, and other movable articles which usualy go with the locomotive, such as lampblack, packing material, sand, soap, switch keys, metal polish, torpedoes, etc.; in fact, it generally covers all the articles except fuel, water and lubricants. In the monthly statements of locomotive expenses gotten out by many roads, water is often excluded altogether, and does not appear in such statistics, probably being charged to a water supply account, although it properly is a locomotive operating charge just as much as coal or oil, but it is probably never charged individually, as no means are provided to ascertain how much is used by any engine or class of service. As with tools, these supplies of a miscellaneous character bear little ratio to the size of the engine, but more to the diligence of the men.

The cost of "tools and supplies" is sometimes stated in two ways—the cost per "turn" or per "engine handled," which means the number of times that engines come into the roundhouse, practically the number of trips made, and the cost per engine-mile or ton-mile. If we were seeking a strict basis for comparison, we would probably find that a combination of the ton-miles made and the number of trips completed would be required for our foundation, as they both affect the cost, so ordinarily a long run or division would be expected to cost more per turn and less per *ton-mile* than a short one. This is apparently borne out by comparing two contiguous divisions of the Chicago & North-Western, where the freight traffic is nearly the same, but one division having much longer runs than the other. For a number of months we find that the charge, "tools and supplies," is smaller per *ton-mile* for the division with the long runs than for that with the shorter runs. The figures are as follows, in cents per 1,000 ton-miles:

	Per 1,000 ton-miles.						
Short runs	$0.0027	$0.0034	$0.0025	$0.0026	$0.0019	$0.0027	$0.0020
Long runs	.0021	.0025	.0022	.0022	.0015	.0019	.0017

The tonnage per engine-mile was not greatly different on the two divisions, but it was somewhat in favor of the short run section, *which had the highest costs.*

In the *Railroad Gazette*, February 19, 1904, appeared an article by C. H. Fry on costs of locomotives at terminals, and from this we find that the supplies are given for one road at one cent an engine turned. As these figures are the same throughout the turn included, they excite some suspicion, especially as very little can be put upon an engine for this amount. This is more than likely the cost of labor connected with sanding engines, etc., rather than the cost of supplies themselves. By figuring over several statements it seems as if an average would be in the neighborhood of 20 cents per trip for tools and supplies.

Coming now to the cost on a mileage basis, comparison of a number of statements from both Eastern and Western roads reveals a variation of from .13 to .34 cents per engine-mile, with the average between .20 and .21 cents. But half of these various costs lie within 10 per cent. variation from .20 cents, so that if we consider one-fifth of a cent per engine-mile as the cost of "tools and supplies," we are not likely to be far from the truth, although individual cases may vary considerably. If we consider that a locomotive comes into the roundhouse once a day on the average, and makes 3,000 miles a month, or 100 miles a day (which is not far from the ordinary conditions in this country), we should have $\frac{100}{5} = 20$ cents per trip, which checks with our former assumption.

Besides the regular miscellaneous articles there are others which may or may not add to the expense of operation. Oil burning headlights are very cheap to operate, but if we want a better illumination we must go to acetylene or electricity. The cost of operating these lights per hour seems to run about as follows:

Oil	¼ cent per hour.
Acetylene	½ " " "
Electricity	2½ cents " "

The latter, when run by a small dynamo, as is generally the case, exerts its influence on the coal pile, and with fuel costing $1.50 per ton, the expense will be about as given above. While this is the most expensive as far as actual cost of operation is concerned, the illumination is immensely greater, being estimated at from 50 to 100 times that of oil; for equal quantities of light, therefore, it is much the cheaper, considering illumination. There are one or two disadvantages connected with the use of the electric headlight, however, and one is, if for any reason it is inoperative, the darkness seems much more intense, as the previous illumination was so great. If the apparatus is carefully installed and maintained, there need be little of this trouble, and for passenger locomotives there is no doubt that it is the most desirable light. On double-track roads it occasions certain discomforts to engineers of opposing trains, and it is very difficult to judge the distance of an approaching train, the light being so intense.

In warm climates the acetyline light is quite satisfactory, but in the north it is subject to a certain amount of trouble from freezing. The illumination is much better than with the oil lamp, but, of course, it cannot approach the electric arc.

Steam heat applied to the cars of a passenger train and supplied by the locomotive is another item of additional cost, though quite small. In some tests made by the Gold Car Heating & Light-

ing Co. on the Northern Pacific Railroad in extremely cold weather, by catching the drips from the cars, it was found that 62 pounds of water per car per hour were obtained; ordinarily it would not average over 50 pounds, so that if we assume ten pounds of coal burned on the engine per car per hour, in addition to the regular amount needed for moving the train, we will be on the safe side. With 10-car trains this would be only 100 pounds per hour, and while it should not be noticeable to the enginemen, it exists and must be provided for. Of course, if there are leaks in the train pipe, as sometimes occur, especially at the couplings, the amount will be increased.

Electric lighting of trains, whether the current is generated by a steam engine and dynamo in the baggage car, or whether the generators are driven by the axles of the cars, places an increased coal consumption upon the engine. The Northwestern Limited trains between Chicago and St. Paul were lighted by the former method, the current in use during the evening representing about 15 kilowatts, or 20 horse-power. If each car is lighted with 600 candle-power, there will be about 2,400 watts required, or, say, 3 horse-power per car, and this will represent in round numbers about 15 pounds of coal per car per hour. Of course, this figure will vary, but this is perhaps an average condition.

Under certain conditons there may be other items to which we have not specifically referred, but while they cause some increase in the cost of operation, it is not, as a rule, large. These figures do not include repairs or maintenance of any of these special appliances, but merely the amount of supplies necessary to operate them. Freight trains ordinarily contribute few extra drafts upon the locomotive, unless it be in the matter of leaky air-brake pipes, which has been referred to previously.

There will be an extra amount of water used to correspond with this the coal consumption noted, but the value of this is so slight that it would be a useless refinement to consider it for our purpose.

(To be continued.)

A Handsome Passenger Locomotive of 1861.

BY C. H. CARUTHERS.

The exigencies of the Civil War early made serious inroads upon the efficiency of the rolling stock and motive power of many of the northern railroads. None of the companies realized this to a greater degree than the Pennsylvania, and that corporation soon placed large orders with M. W. Baldwin & Co., and orders of larger size with R. Norris & Son and with the Rogers Locomotive and Machine Works, for larger and more efficient engines than has been used on its road, and it also began to overhaul the 211 engines in service at the beginning of 1861. Forty-nine of these engines were small, and a number of the 49 were about worn out, but most of the remainder were of a fair size for that period, and justified the extensive repairs which in some instances almost converted them into new engines. The prevailing high cost of materials seemed to merit retaining even a very small part of the engine in rebuilding, if such part were in fair condition.

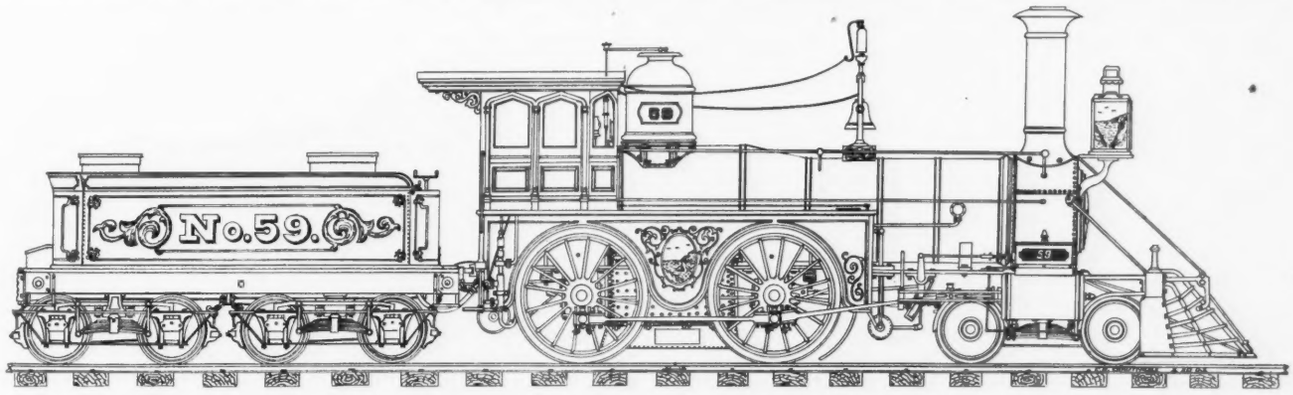
The drawing shows an engine so rebuilt at that time, partly at Pittsburg and partly at Altoona, which went into service in its new form in December, 1861. It was one of twelve built by R. Norris & Son in 1853 and bore that firm's construction number of 643. Originally it had cylinders 16 inches x 24 inches; driving wheels, 60 inches; and weighed about 57,000 lbs. Its boiler was of flush-top type, its valve-gear was "V" hook type with an independent half-stroke cut-off. The fuel used was wood. The running-boards were protected by stout hand-rails on the outside, and the frames from the front bumper to the first driving-box pedestal were of slab type, about 9 inches high. The driving springs were two in number, one on a side, bracketed at the center to the side of the boiler immediately under the dome, and having the ends connected by adjustable posts to a long equalizer which rested directly over the tops of the boxes.

As rebuilt, only the cylinders, square-bottomed smoke-box, and first three rings of the boiler barrel were retained from the original engine. All else was new. The firebox was made longer and fitted with Gill & Co.'s smoke condensing device, consisting of an iron diaphragm provided with water circulation, and a combustion chamber about 30 inches long placed in the tapering ring which united the boiler barrel to the new roof-sheet of wagon top type. The deflector occupied practically the position of the firebrick arch adopted later. Drivers 66 inches in diameter were used, and frames similar to those used until the recent introduction of those made of cast steel were used with four driver springs, but the equalizers of these were placed between the upper and lower bars, and were pivoted on the lower.

The hook motion gear was replaced by shifting links with an underhung reversing shaft—an arrangement used considerably in those days. The sand boxes were two in number and placed, one on each side of the boiler, behind the wheel covers; and the bell-frame entirely surrounded the bell and had the whistle placed upon its top, one side of the frame being cored out to allow steam to pass from the boiler to the whistle.

This was the first Pennsylvania R. R. engine to have the tallow cups placed in the cab, and the connecting pipes entered the steam supply pipes instead of the top of the steam chest. The cab was elaborately built of black walnut with ash window sash, and was not painted, but was varnished inside and out, thus showing the beautiful grain of the wood to advantage. The "water-works" were wofully defective and during three years of their retention gave frequent trouble. In rebuilding, both of the original pumps had been removed, and were replaced by a single adjustable brass injector of the original Gifford type placed vertically behind the rear driving wheel on the right hand side of the engine.

The straight stack shown had no netting or spark arrestor of any kind, and nine months after the engine came out, was replaced by a semi-balloon type designed by John P. Laird and used by the company on all passenger and many freight engines until 1870. The engine was painted in bright colors; vermilion wheels, center panel of tender, and number plate; peach-blossom wheel covers with landscapes in the centres; and the whole neatly ornamented with striping, arabesques, and lettering in gold leaf. It compared favorably in service with larger and later engines, following closely, as will be noted, modern lines of practice, and was only retired and cut off in 1881, strange to say, retaining the original walnut cab placed on it twenty years before, but of course painted in its later years with the company's standard black. In these later years of its service (from 1868) the sand-boxes were removed from behind the wheel casings and were replaced by a round one of standard type, set on the top of the boiler; the single brass injector was replaced by two Sellers, 1876 type, and the cast-iron steam chest casings with panels containing the number in raised figures were replaced by those of standard type. Three other Norris engines were similarly rebuilt on the same lines as the 59, except that one retained the 60-in. driving wheels in order to make it more efficient in its service as passenger helper on the mountain.



Rebuilt Pennsylvania Passenger Locomotive Monongahela, 1861.*

*Originally built by Richard Norris & Son., Philadelphia, in 1853. Cylinders, 16 in. by 24 in.; first drivers, 60 in., after change, 66 in. First P. R. R. engine with tallow cups placed in cab. The pipes from cups entered steam chest through the admission ports and will be noticed just below valve-rod glands. Bell and whistle in one fixture and sandbox under wheel casing. One injector and no pumps.

After finishing the work at Port Belgrano, the new military port in Argentina, which has a dry dock, etc., the Italian engineer, Luigi Luiggi, has returned home, and has been appointed State Councillor for the management of the Italian railroads.

Handling Fast Freight on the Santa Fe.*

About three years ago the Atchison, Topeka & Santa Fe put into general use on its main line trains between Chicago, Galveston, Denver, El Paso, San Francisco and San Diego a system of handling all high-class and special freight, known as the Red Ball system, which had been in use on some parts of that road since 1892. The movement and tracing of freight has been greatly facilitated by the change and the auditor's office relieved of a mass of correspondence relating to car movements and delays. The list of commodities handled under this system includes nearly every class of general merchandise and perishable goods; but unless by special instructions, or in order to fill up trains to the tonnage rating of the locomotive, no dead freight, such as lumber, coal, cotton, wheat or similar classifications, is handled in Red Ball trains.

Certain of the more important stations, about 60 in all, have been designated as Red Ball billing stations. Each of these stations is designated by a letter or letters and is assigned a series of numbers beginning with one and running up to from 20 to 700, depending on the number of loaded cars forwarded, which numbers are used in numbering the envelopes carrying the waybills for cars loaded with Red Ball freight. Each billing station uses its numbers consecutively, commencing with the lowest number; when the highest number in the series assigned has been reached, the serial numbers begin over again with one and this is repeated indefinitely. Each car loaded with Red Ball freight has tacked on the side as a destination card, a card 7 in. x 9 in. with a large red circle printed on it. These cards are tacked on each side of the car. On the red disk is printed in white letters the number of the train in which the car is to travel. On arrival at destination these cards are removed.

Accompanying each car of Red Ball freight and every empty car handled as Red Ball freight is a Red Ball freight envelope 5 in. x 11 in. The front of the envelope is printed with copying ink on red paper. The forms used are substantially the same as those shown for the Canadian Pacific, in the *Railroad Gazette*, Sept. 23, 1904. At the top are blank spaces for filling in an identification of the car and contents and instructions for routing to destination. Below these are blank spaces for inserting the number and symbol of the train in which the car is traveling and also the symbol letter and serial number of the forwarding station. Blanks are also left for recording the weight of the car and for a reference to the regular waybill. At the bottom are printed a few simple instructions to conductors and agents. On the back are blank spaces for entering the record of the car's movement. Each conductor when the car is turned over to him at the forwarding point or at a division point must enter in the space provided, the number of the train and train symbol, station taken from and left at, date and signature. When loaded cars are accompanied by the regular waybills all of the waybills for the car are enclosed in the envelope.

When all of the cars containing Red Ball freight which are to go forward from any station in one train are ready, the envelope covering the car for the nearest destination is given the lowest symbol number and envelopes covering cars for points beyond are given successive symbol numbers in order. For example, Chicago forwards Red Ball freight on a certain train as follows: One car for Joliet, three cars for Pekin, five cars for Galesburg and four cars for Nemo. These envelopes would all bear the Chicago symbol "C. H." and the opening symbol number, which, for example, is 12, would be given to the car for Joliet; 13, 14 and 15 would be given to Pekin; 16, 17, 18, 19 and 20 would be given to Galesburg, and 21, 22, 23 and 24 to Nemo. The opening number for the next envelope of Red Ball freight from Chicago, regardless of destination, would be 25.

Trains carrying Red Ball freight and originating at Chicago, Kansas City, Denver, Galveston, San Diego and Port Richmond are known as symbol trains and bear symbol letters showing the date of departure in addition to the train number. For example, train No. 33 leaving Chicago on the first day of the month carries the symbol 33A, clear through to San Diego, where it arrives nine days later. The same train leaving on the second day of the month is known as 33B and so on for each day. These symbols are used in reporting the trains or cars in the trains and in all tracing.

When a train of Red Ball freight has been made up and sent out from any terminal, the envelopes are all in the hands of the train conductor. The agent at the forwarding point reports to the Superintendent of Transportation all cars sent forward in Red Ball trains, the report giving all symbol letters and numbers. It is known as a "Consist Report" and is made by telegraph immediately after the car has gone forward. All conductors and yardmasters handling Red Ball freight are furnished with a form known as "Set-out Car." In the event of a car being set out of a train of Red Ball freight for any cause this form is made out giving full information about the reasons for the delay. It is a distinctive color and is mucilaged on the back so that it can be pasted on the face of the red envelope accompanying the car. It indicates to every one that the car has been delayed by being set out and must not be set out again except for bad order. When the car is set out between terminals the conductor makes out the report and if set out at a terminal yard the yardmaster makes it out. The report with the envelope attached is left by the conductor or yardmaster with the telegraph operator at the point where the car was set out and he immediately telegraphs in full the information given thereon to the Superintendent of Transportation. If the freight is transferred to another car, the necessary information is entered on the red envelope accompanying the shipment, but no change is made in the original symbol letter and number; this identifies the shipment to its destination.

A form known as "Delayed Cars Forwarded Report" is used by agents and yardmasters to report by wire to the Superintendent of Transportation the forwarding of all cars of Red Ball freight which have been delayed. This form is also used by division yardmasters in reporting the forwarding of such cars delayed for whatever cause when not sent out in the same train of the same date on which they arrive.

As a train of Red Ball freight proceeds over the road it is reported by telegraph to the Superintendent of Transportation from certain stations designated for that purpose. These reports are made out on a form known as a "Passing Report," which shows the train number and symbol, station symbol and serial number of each car in the train, and the time the train passed with any detailed explanations that may be necessary about the cause of delays. When the train or cars in the train arrive at destination the conductor turns over the red envelope containing the waybills to the agent and the agent reports the arrival by symbol letters and numbers. If a car of Red Ball freight is to be delivered to a connecting road or branch line the Red Ball billing is applied only to the junction point, but every effort is made by the agent, trainmaster and superintendent to have the car forwarded from there as nearly on time as possible. Agents report such cars on the "Passing Report" showing time of arrival and departure over the connecting

Red Ball freight in cars loaded at stations between district terminals is forward by local train to the first district terminal and there switched into a solid Red Ball freight train for through transit. Agents at stations not designated as Red Ball billing stations advise the agent at the first Red Ball billing station on the route of the car when a car entitled to the special classification is forwarded from this station and he applies Red Ball cards when the car arrives and makes all reports the same as if the car originated at his station.

Local merchandise cars traveling as Red Ball freight are forwarded as such to the last district terminal reached before distribution begins and are then set out to be forwarded in a local freight train. For example: Chicago loads a car of local freight for points between Newton and Dodge City. This car is red balled to Newton, where it is set out and put in the local train betwen Newton and Dodge City. All such cars are reported with time of arrival at the point set out and time of departure in the local train, on the "Passing Report."

The object of the whole system is to run all important freight through with a minimum amount of red tape and telegraphic reporting and to insure its prompt delivery at destination. The Superintendent of Transportation is at all times kept informed of the location of all Red Ball freight on the road and the reasons for any delays. By running trains of high class freight through solid and bunching consignments to intermediate points as much as possible the maximum train loads can be maintained. When necessary any train can be run in two or more sections and the deficiency in loading of the last section made up from cars of dead freight consigned to the same points, a supply of which it is attempted to maintain at all times.

*A previous article in this series, describing the system in use on the St. Louis & San Francisco, appeared in the *Railroad Gazette*, Aug. 18.

D., L. & W. Improvements at Newark, N. J.

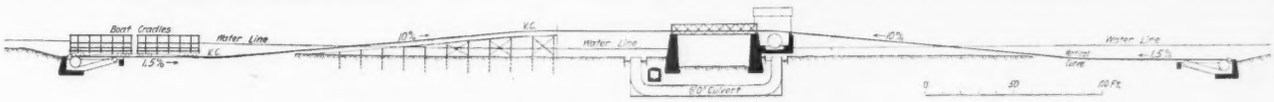
In the Lackawanna improvements at Newark, N. J., which were described in the *Railroad Gazette*, Nov. 27, 1903, the work was divided into three sections, as follows: Section No. 1, extending from the Passaic river to 200 ft. east of Boyden street, which was all elevation, and all but 300 ft. of which was built on a new line; section No. 2, extending from 200 ft. east of Boyden street to Third street, and section No. 3, extending from Third street to the East Orange line. The latter two sections are depression, and the new location is almost identical with the old. The making of two sections of the depression was necessitated by the location on section No. 2 of the Morris Canal, the bottom of which is four feet above the new top of rail in the depression. As there had been a great deal of talk of abandoning this canal, no definite plan of taking care of the canal to allow the railroad company to complete the depression was adopted, until the spring of 1904. Hence section No. 1 was completed, and section No. 3 nearly completed, before the work on section No. 2 was begun.

The grade of the old tracks from High street to Nesbitt street

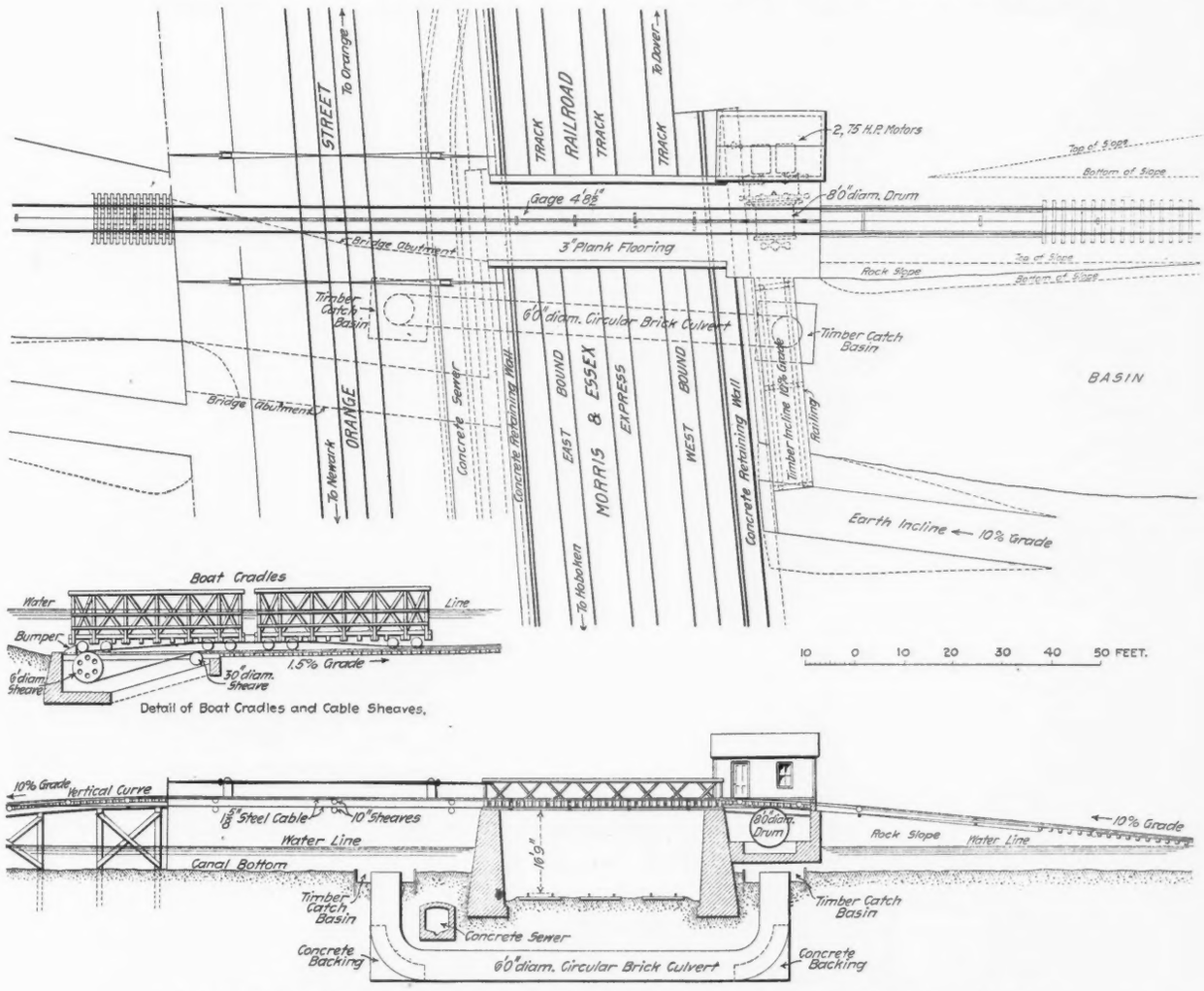
was 2.7 per cent. ascending, and from Nesbitt street to Seventh street the old grade was about parallel to the new one, which is 1.14 per cent. from High street to Seventh street. In order to go ahead with the completion of section No. 3 without waiting for the question of section No. 2 to be settled, a temporary grade line was adopted from the old grade at the Morris Canal to the new grade just east of Third street.

Great difficulty was encountered in this work inasmuch as uninterrupted traffic had to be maintained for nearly 100 passenger trains each way per day, besides the local freight. Aside from the traffic difficulties the construction work had all to be done within a 60 ft. right of way. The only special problems on section No. 2 were the Morris Canal crossing and the moving of the large retail coal pocket between Sheffield street and Nesbitt street to a new location between High and Boyden streets.

The method of operating a canal across a railroad in a depression where the top of rail of the road is 4 ft. below the bottom of the canal is a novel one, and was designed by Chief Engineer Lincoln Bush, and is shown in the accompanying illustration. An inverted brick syphon 6 ft. in diameter was built from the north side of the north retaining wall to the south side of a 5-ft. x 6-ft. sewer south of the south retaining wall. This sewer was constructed under the canal in April, 1902, as a part of the intercepting sewer built on section No. 3, in the south retaining wall from the Milbrook sewer in Branch Brook Park, east of the canal to 14th street. This inverted syphon is to equalize the level of the water in the canal on each side of the depression. The boats will be floated into racks mounted on wheels which are similar to those used by the Morris Canal on its inclines at different points over the



General Elevation of the Morris Canal Inclined Plane Over the D. L. & W. R. R. at Newark, N. J.



Details of the Morris Canal Inclined Plane Over the D. L. & W. R. R. at Newark, N. J.

The method of building section No. 2 was almost identical with that adopted on section No. 3. The retaining walls were built on either side of the proposed depression, and a temporary timber trestle was erected in a core excavated to the new grade adjacent to the south wall. A double track trestle was constructed between Sheffield and Nesbitt streets, and between Eighth avenue and Third street. By making an amicable agreement with each of the property owners having a business entrance on the M. & E. Railroad avenue between Nesbitt street and Eighth avenue south of the tracks the city authorities allowed the railroad to run one of its temporary tracks on this street, the other temporary track being supported on a trestle across the south retaining wall, between these points. The traffic at this date has been turned over on the temporary trestle from Sheffield street to east of Eighth avenue, and the work of excavating the core proper has been begun. This is done by moveable derricks of the stiff leg type, which load the material in cars on a track located on the north retaining wall.

The D., L. & W. operates a retail coal pocket at Newark, which is located between Sheffield and Nesbitt streets. In the depression

State of New Jersey. The boat is then pulled up the incline, which is a filled-in bank on the north side, across the depressed tracks on a lattice truss bridge, across Orange street at grade and down into the canal on a pile trestle incline south of Orange street. The power proposed to be used is electric motors. The inverted syphon was built in March and April of the present year, and it is proposed to build the incline after traffic is stopped in the canal this fall. In order to construct the depression to either side of the canal during the canal season, a timber flume was constructed across the proposed depression and the canal is operated through this flume at present. This will allow the railroad to excavate the core and lay the new tracks up to the canal on each side, and when traffic is stopped in the canal the railroad company expects to be able to drop its traffic into the depression within three weeks.

of the tracks a new location between High and Boyden streets was decided upon for this structure. The entrance to the coal pocket for teams was planned at the High street end. As the grade of High street is about 16 ft. below that of the new top of rail, however, it was deemed advisable to build the pocket in a depressed area, the bottom of which was to be level with the grade of High street. This necessitates the excavating of about 40,000 cu. yds. of material, three-fourths of which is solid rock. This excavation is being done with a steam shovel. By adopting this plan a pocket with a capacity of 4,500 tons and an approach of a 3 per cent. grade was procured. The present coal pocket is a gravity affair, and the new pocket will be almost exactly similar to the present one, except that all exposed surfaces will be covered with corrugated iron to comply with the fire ordinances of the city of Newark. It will be necessary to have the new coal pocket completed before tearing down the present one. The railroad company expects to have the new pocket completed and ready for operation by January, 1906.

The area between Boyden and Nesbitt streets, south of the main tracks to Orange street, will be excavated for a carload delivery yard. The grade of the yard at Orange street will be three feet higher than the grade of the main tracks exactly opposite, making the grade of the diagonal team tracks level.

The work of depressing section No. 2 is being done by Sandford & Harris Co., of Hoboken, N. J., who also did the work on section No. 3, and the river work on section No. 1. The excavation and concrete foundations for the coal pocket is being done by Burke Bros., of Scranton, Pa. The superstructure is to be erected by Sandford & Harris Co.

The work was all planned by Chief Engineer Bush, of the Lackawanna Railroad, and is being constructed under the general supervision of Mr. E. I. Cantine, Division Engineer of the railroad company. For the above information we are indebted to J. H. Philips, Assistant Engineer, D., L. & W. R. R.

Time Freight on the Boston & Maine.

In response to a request for a description of the system used by the Boston & Maine for handling time freight, W. J. Hobbs, Fourth Vice-President and General Auditor, sends the following statement of the method used at Boston, Warren Bridge, which is typical. It is, of course, very simple as compared with that of the Atchison, shown in another column.

Trains are made up in proper order with empty cars during the night, and cars loaded to various points are in the same position every day. Traffic via Fast Freight Lines is all loaded at No. 10 house, which is 1,400 ft. long and has 47 doors on track side. There are six tracks and about 120 cars are placed at one placing. Tracks are numbered from 1 to 6, and from numbers of doors and tracks the location of the various cars is obtained; for example, for car set at No. 15 door, 4 track, we use the term 15-4, and checkers and freight handlers understand from this information what car to load.

For each car a slip about 8 in. long and 3 in. wide is made, which gives destination, Fast Freight Line, car number and location. Slips are made each morning as soon as car numbers are taken and destination arranged for by the foreman for the different places to which cars are loaded. The slips are placed in pigeon holes in a large rack in which are sorted receipts for freight in the house. Each pigeon hole represents a car and is marked in the same manner as loading slip.

The receipts for freight received from teams are sent to the foreman's office by receiving clerk as fast as received, and they are there sorted into the proper pigeon holes in the rack. It is customary to start a straight car for any point when it has 6,000 lbs. or more; for example, pigeon hole and loading slip will be marked "Chicago Transfer, C/o C. & N. W.-M. D. T." This indicates that all freight for points on or via C. & N.-W. consigned via M. D. T. should be loaded in this car. The checker will be given all receipts in the proper pigeon hole with the loading slip, and each receipt is marked by the receiving clerk with the door number where the freight is taken into the house, which is as nearly as possible opposite to the car.

Each checker has a gang of five or six men, consisting of one man tipping on to truck, and three or four truckmen and man in car stowing freight. The checker designates freight to be sent to car, and the freight handler is given the location of the car, as, for example, 15-4, which means No. 15 door and No. 4 track, and when he returns from depositing the first load he brings back the car number to the checker, who compares with number shown on loading slip, and if the number agrees, it is proof that the property is being placed into the correct car. He continues loading the same car until all receipts in hand are finished. The loading slip is then returned to the rack to be again given out when further receipts are sorted. As fast as property is loaded, the weights are shown on the loading slip, and when the car is completed, they are footed, which gives us total weight of freight in car.

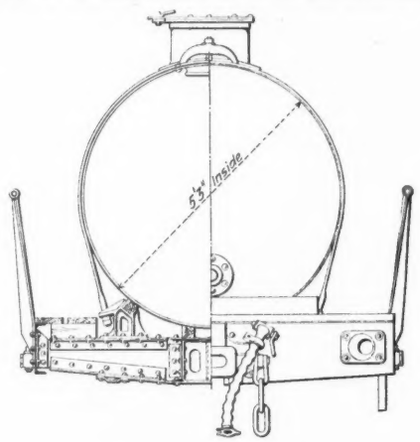
Fast trains 257 and 259 are closed 15 and 25 minutes, respectively, previous to leaving time. This amount of time is allowed for closing of doors, sealing cars and testing air. Train 257 leaves Boston at 3.30 p.m., and 259 leaves at 3.40 p.m., arriving in Rotterdam at 1.20 a.m. and 1.30 a.m. next morning, respectively; a run of 212 miles in 9 hours and 50 minutes.

All freight received up to 3 p.m. for the fast trains is loaded before closing at 3.15. For this fast train service, transfer cars from manufacturing towns in the near vicinity of Boston are also handled. Waybills are sent direct to the freight house, and the cars are ordered by the foreman to the most convenient spot, to avoid long trucking. For all the items on the waybills the company makes an expense voucher, giving complete information, and on each voucher is marked the car number and location of car to which each shipment is to be transferred, and the same method follows in handling transfer shipments as loaded from freight house floor. All shipping receipts and transfer vouchers are sent to the local office as fast as loaded, for billing purposes.

A running slip is made for each car and accompanies same to destination. The running slip gives full information as to route, fast freight line, etc. Waybills are made as soon as possible and forwarded under cover, in some instances by United States mail, some by train mail and some by express, to proper junction point in accordance with arrangements in force with each fast freight line.

Tank Cars for the Argentine Government Railways.

The accompanying drawings show the principal details of the tank cars recently built by the Middletown Car Works, Middletown, Pa., for the San Juan extension of the Argentine Government Railways in Northern Argentine Republic. This lot of 25 tank cars is part of a large order of equipment for this new line, the other cars being box, flat, gondola and stock. The box cars were illustrated in the *Railroad Gazette*, July 14, the gondola cars, May 5 and the flat cars March 3, 1905. These tank cars have underframes as nearly like those for the other types of cars as it was possible to make them and provide for securing a tank of the required size. The cars are 33 ft. 10 in. long, back to back of end sills, and 7 ft. 2 in.

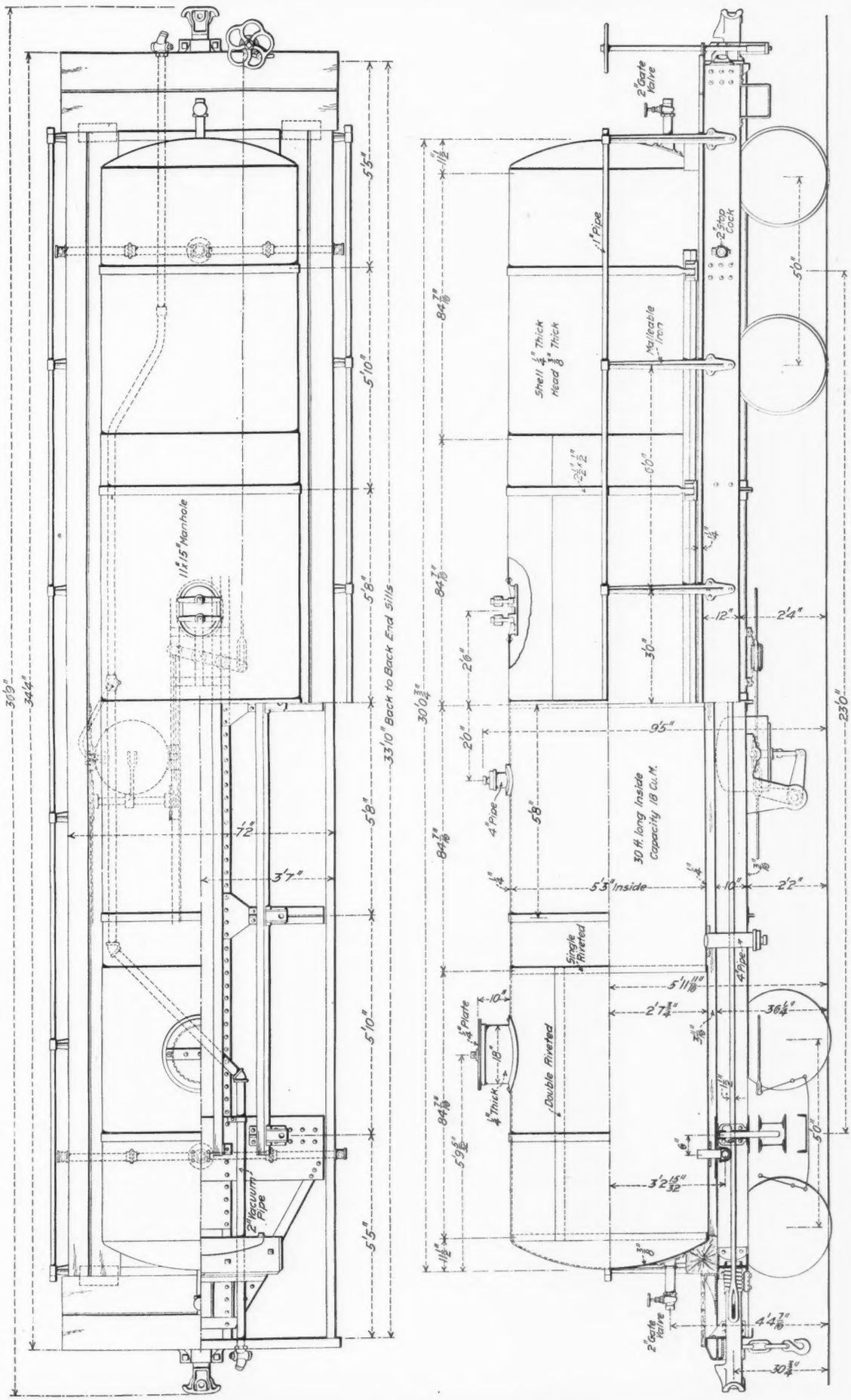


Part End Elevation and Cross-Section.

wide over side sills. The underframe is built up of 12-in. channels for longitudinal sills, built-up bolsters and bent plate end sills. They are mounted on diamond arch bar trucks of meter gage and are equipped with vacuum brakes, continuous draw-gear and link and pin couplers.

The tank is 30 ft. long inside and 5 ft. 3 in. in diameter and has a capacity of 18 cubic meters or 4,754 U. S. gallons. It is made of ¾-in. plates and the spherical ends are formed from ⅝-in. plates. In the top are placed an 11-in. x 15-in. manhole, an 18-in. dome, 10 in. high and a 4-in. filling pipe. The contents can be drawn off through a 4-in. pipe in the bottom, extending below the center sills or from 2-in. cocks which are outside of the side sills at the ends of a branch pipe near one end of the car. Two-inch gate valves at the ends of pipes leading out of the tank heads can also be used for drawing off the greater part of the contents. The tank is mounted on substantial oak head blocks secured on top of the center sills between the end sills and bolsters and on bearing strips carried in brackets riveted to the tops of the bolsters and cross bearers. These brackets also secure the tank bands which are 2½ in. x ½ in. A 1-in. pipe railing runs along each side of the tank and a narrow running board is fastened on top of the cross-members of the underframe. The ends of the car are decked over between the end sills and head blocks.

We are indebted to Mr. George I. King, Vice-President and General Manager of the Middletown Car Works, for the drawings.



Part Plan, Side Elevation and Sections of 4,700-Gallon Tank Car for the Argentine Government Railways.

Reports on the Mentor Disaster.

Coroner Siegelstein, of Cuyahoga County, on August 16 rendered a verdict in connection with the wrecking of the Twentieth Century Limited at Mentor, Ohio, on the night of June 21, in which 19 lives were lost. The Coroner holds that Walter F. Minor, the telegraph operator at Mentor, opened the switch which caused the accident. The verdict, in part, is as follows:

"I find that the switch was opened by Walter F. Minor, the night telegraph operator in charge of the station. I reach this finding by deduction; i.e., after having read over the notes on the testimony taken at the Painesville inquest, which I attended, and the testimony taken at my own inquest, I find that the time (according to observations taken by this office), from which the headlight of the Twentieth Century Limited train is seen approaching from the station platform at Mentor until it reaches the switch, is a maximum of 31 seconds. During this brief period of time, if Mr. Minor did not throw the switch on that night, and another person did, then that person must have appeared at the switch from some unknown place, unlocked the lock with a key, removed the lock, taken the coupling pin out, turned the switch, put the coupling pin in place again, placed the lock in the hole of the coupling pin, locked the lock and disappeared—a physical impossibility in my opinion. In the 500 folios of typewritten testimony taken at my inquest there appears not one word tending to show the presence of anyone but Minor, who was in charge of the station that night, in the immediate vicinity of the station or the switch, immediately preceding the wreck or afterward.

"Hence I can only come to the conclusion, which is reinforced by other points of the evidence, that Walter F. Minor opened the switch, but whether he did so of his own volition or by telegraphic orders of a superior officer I am not prepared to say."

State Railroad Commissioner J. C. Morris on August 17 made a report from which we take the following essential paragraphs:

"The derailment took place about 70 ft. east of the frog. The main track was found to be in good condition and the switch points, stand, bridle rods and all attachments were found in good working order and neither main track nor switch showed any signs of having recently received any repairs, which proved at once that neither the physical condition of the main track nor of the switch was in any degree responsible for the accident.

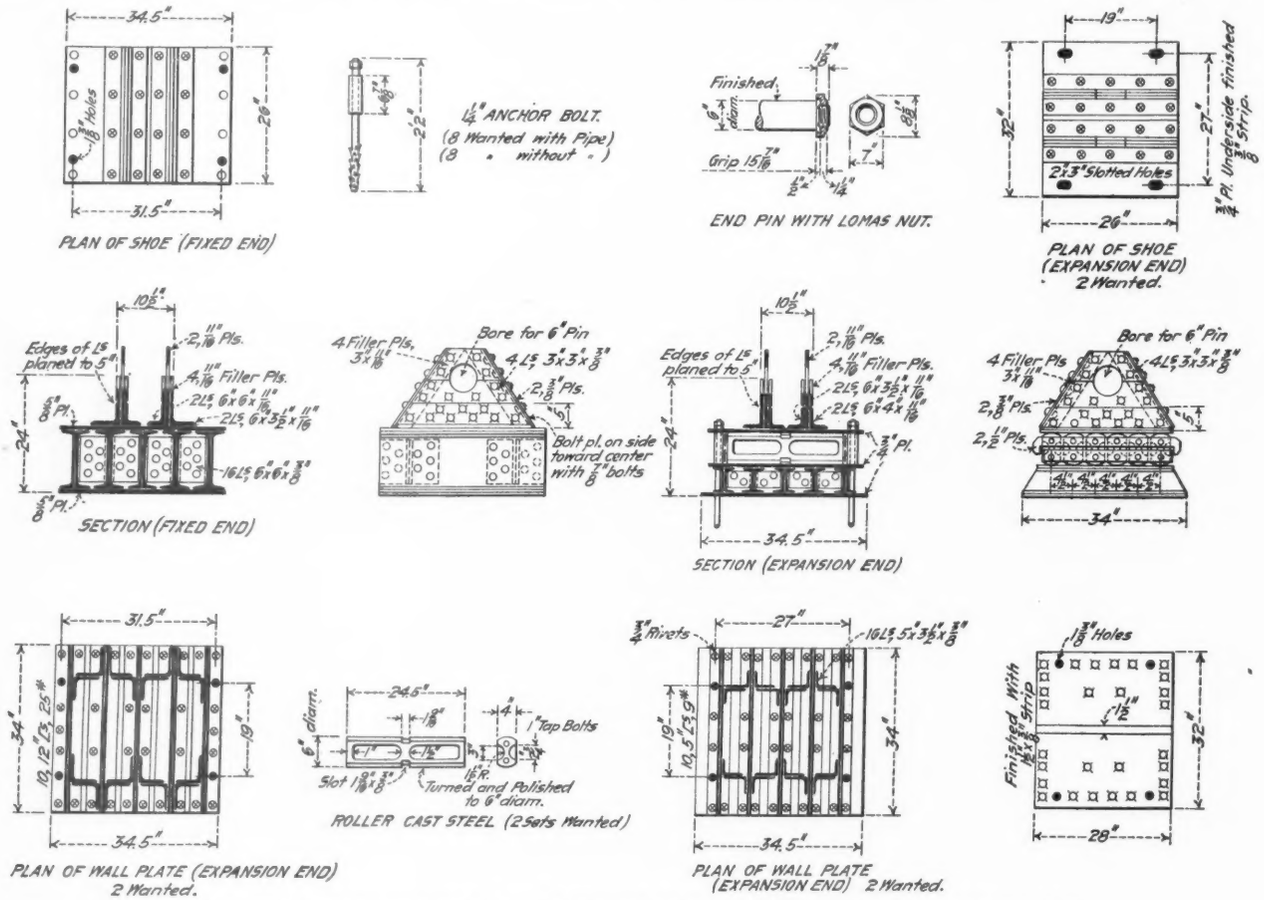
"An examination of the operator's train report showed that no trains passed Mentor in either direction between the passing of train No. 10, eastbound, at 8.31 p.m., which did not stop, and the arrival or No. 26, the wrecked train. A further examination of the operators' train reports at Wickliff and Willoughby, telegraph points immediately west of Mentor, and the original train sheet kept by the train despatcher at Buffalo, confirms this and shows no discrepancies in the records in any manner. A number of persons were interviewed and their statements, together with the testimony as given by the operators, train despatchers and train crews before the Coroner of Lake County, corroborate the official train sheet in the despatcher's office at Buffalo. The only eastbound train between Collinwood and Mentor was freight train 5919, which was passed by No. 26 on the four track portion of the road about nine miles west of Mentor, 5,919 running on track number 4 and No. 26 on track number 3. Owing to the distance from Mentor to the point where No. 26 passed 5,919, and the fact that there are two telegraph offices, one at Willoughby and the other at Wickliff, between these points, would indicate the improbability of the switch [at Mentor] being opened for the purpose of permitting 5919 to clear the main track for No. 26. I find that the switch was in the position of "open" and had been placed and locked in that position by some person in possession of a switch key."

Commissioner Morris then recommends distant signals for facing point signals, and the use of easier curves at the entrances to passing tracks. He says nothing as to who misplaced the switch except that the coroners and the railroad company have put forth every effort to discover the one responsible.

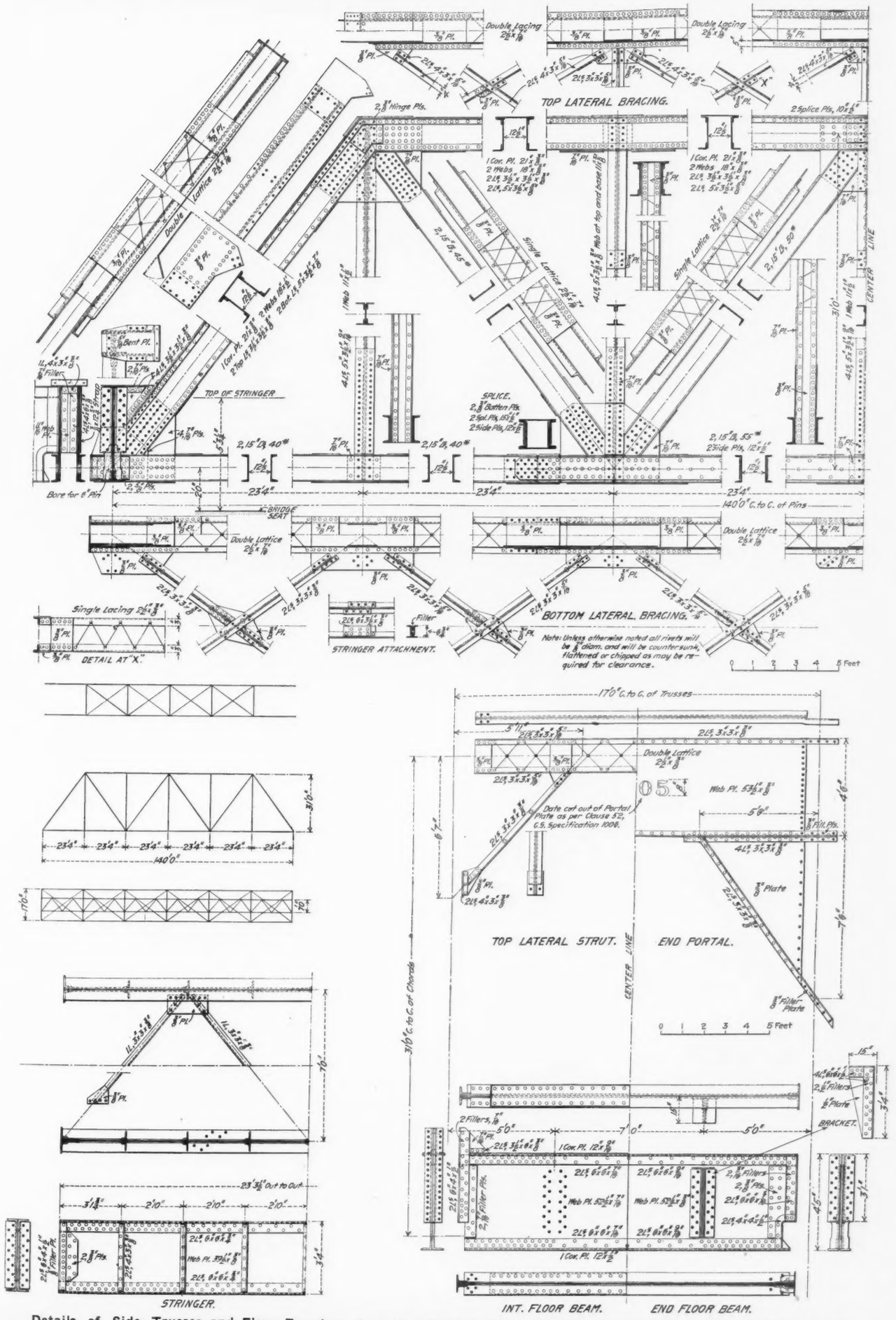
Standard Bridges on the Harriman Lines.*

The 140-ft. riveted through truss bridge shown this week again has some differences in the details of the various members over any of the shorter spans previously shown. The number of panels has been increased to six with single diagonals in each panel. These are made up of two 15-in. channels, 45 lbs. and 50 lbs. per ft., with single lattice across the top flanges. The top chord is built up of a cover plate 21 in. x ⅜ in.; two webs 18 in. x ⅜ in., spaced 12½ in. apart; two top flange angles 3½ x 3½ in. x ⅜ in., and two bottom flange angles 5½ in. x 3½ in. x ⅝ in. The end diagonals are fabricated in a similar manner but of heavier sections. For the bottom chord two 15-in. 40-lb. channels with ½-in. side plates are used as in the 125-ft. span. The estimated weight of one span complete is 273,000 lbs.

*Previous articles appeared in the *Railroad Gazette* March 17, 24, 31, April 7, 14, 21, 28, July 28, August 11 and 18.



Details of End Bearings for 140-ft Riveted Through Truss—Common Standard, Harriman Lines.


TOP LATERAL BRACING.
BOTTOM LATERAL BRACING.
TOP OF STRINGER
BRIDGE SEAT
SPLICE.
Bore for 6" Pin
140'0" C. to C. of Pins
23'4"
DETAIL AT "X."
STRINGER ATTACHMENT.
Note: Unless otherwise noted all rivets will be ⅞" diam. and will be countersunk, flattened or chipped as may be required for clearance.
0 1 2 3 4 5 Feet
CENTER LINE
170'0" C. to C. of Trusses
Double Lattice
Web Pl. 53½"x⅜"
Date cut out of Portal Plate as per Clause 52, U.S. Specification 1008.
TOP LATERAL STRUT.
END PORTAL.
BRACKET.
STRINGER.
INT. FLOOR BEAM.
END FLOOR BEAM.

Details of Side Trusses and Floor Framing of 140-ft. Riveted Through Span—Common Standard, Harriman Lines.

Statistics of United States Railroads in 1904.

The Interstate Commerce Commission has published the advance sheets of its statistics of the railroads of the United States for the year ending June 30, 1904. The total route mileage at that time was 213,904 miles (partly estimated), having increased 5,927 miles in the year ending on that date. This increase exceeds that of any previous year since 1890. The 19 states and territories for which an increase in mileage exceeding 100 miles is shown are Alabama, Arkansas, California, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, North Dakota, Ohio, Pennsylvania, Tennessee, Texas, Utah, West Virginia, Indian Territory, New Mexico, and Oklahoma. The aggregate mileage (fully reported), including tracks of all kinds, was 297,073 miles, being classified as follows: Route, 212,243 miles; second track, 15,824 miles; third track, 1,467 miles; fourth track, 1,046 miles, and yard track and sidings, 66,492 miles.

The number of corporations included in the report was 2,104. Of this number 1,086 maintained operating accounts, 848 being classed as independent operating roads and 238 as subsidiary roads. In the course of the year, companies owning 5,600 miles of line were reorganized, merged, consolidated, etc. For the year 1903 the corresponding item was 10,486 miles.

The length of mileage operated by receivers on June 30, 1904, was 1,323 miles, showing an increase of 138 miles as compared with the previous year. The number of roads in the hands of receivers was 28, and at the close of the previous year 27, six roads having been taken from the hands of receivers and seven having been placed in charge of the courts.

On June 30, 1904, there were in service 46,743 locomotives, the increase being 2,872. As classified, these locomotives were: Passenger, 11,252; freight, 27,029; switching, 7,610. There were also 852 not assigned to any class.

The total number of cars of all classes was 1,798,561, this total having increased 45,172 during the year. The assignment of this rolling stock was, to the passenger service, 39,752 cars; to the freight service, 1,692,194 cars; the remaining 66,615 cars being in company service. Cars owned by private companies and firms are not included in this statement. The average number of locomotives per 1,000 miles of line was 220, showing an increase of six. The average number of cars per 1,000 miles of line was 8,474, showing a decrease of 66 as compared with the previous year. The number of passenger-miles per passenger locomotive was 1,948,384, showing a decrease of 30,402 miles. The number of ton-miles per freight locomotive was 6,456,846, showing a decrease of 351,096 miles as compared with June 30, 1903.

The aggregate number of locomotives and cars in the service of the railroads was 1,845,304. Of this number 1,554,772 were fitted with train brakes, indicating an increase during the year of 92,513, and 1,823,030 were fitted with automatic couplers, indicating an increase of 52,472. Practically all locomotives and cars in passenger service had train brakes, and of the 11,252 locomotives in that service 11,113 were fitted with automatic couplers. Only 602 cars in passenger service were without automatic couplers. With respect to freight equipment it appears that most of the freight locomotives had train brakes and automatic couplers. Of 1,692,194 cars in freight service on June 30, 1904, 1,434,386 had train brakes, and 1,674,427 automatic couplers.

The number of persons on the pay rolls was 1,296,121, or 611 per 100 miles of line. These figures, when compared with corresponding ones for the year 1903, show a decrease of 16,416 in the number of employees, or 28 per 100 miles of line. The classification of employees includes enginemen, 52,451; firemen, 55,004; conductors, 39,645, and other trainmen, 106,734. There were 46,262 switch tenders, crossing tenders, and watchmen. With regard to the four general divisions of employment, it appears that general administration required the services of 48,746 employees; maintenance of way and structures, 415,721 employees; maintenance of equipment, 261,819 employees, and conducting transportation, 566,798 employees. This statement disregards a few employees of which no assignment was made. The amount of wages and salaries paid to employees during the year ending June 30, 1904, as reported, was $817,598,810.

The par value of the amount of railroad capital outstanding on June 30, 1904, was $13,213,124,679, which represents a capitalization of $64,265 per mile. Of this capital $6,339,899,329 existed as stock, of which $5,050,529,469 was common and $1,289,369,860 preferred, and the remaining part, $6,873,225,350 as funded debt, which consisted of mortgage bonds, $5,746,898,983; miscellaneous obligations, $723,114,986; income bonds, $229,876,687, and equipment trust obligations, $173,334,694. Current liabilities are not included. These amounted to $881,628,720, or $4,288 per mile of line.

Of the total capital stock outstanding, $2,696,472,010, or 42.53 per cent., paid no dividends. The amount of dividends declared during the year was $221,941,049, being equivalent to 6.09 per cent. on dividend-paying stock. For the year ending June 30, 1903, the amount of dividends declared was $196,728,176. Of the total amount of stock outstanding, $6,339,899,329, 5.80 per cent. paid from 1 to 4 per cent.; 14.65 per cent. from 4 to 5 per cent.; 10.64 per cent. from 5 to 6 per cent.; 8.50 per cent. from 6 to 7 per cent., and 9.80 per cent. from 7 to 8 per cent. The amount of funded debt (omitting equipment trust obligations) that paid no interest was $300,894,215, or 4.49 per cent. Of mortgage bonds, $175,817,862, or 3.06 per cent., of miscellaneous obligations, $61,048,625, or 8.44 per cent. and of income bonds, $64,027,728, or 27.85 per cent., paid no interest.

Of the total amount of stock outstanding, $1,942,858,359 was reported as owned by railroad corporations, and of the railroad bonds, $558,472,242 were so reported.

Passenger-mileage for the year was 21,923,213,536, having increased 1,007,449,655. Ton-mileage was 174,522,089,577, the increase being 1,300,810,584. The number of tons carried one mile per mile of line was 829,476, which indicates a decrease in density of freight traffic of 25,966 ton-miles per mile of line.

The average revenue per passenger per mile for the year was 2.006 cents, the average for the preceding year being the same. The average revenue per ton per mile was 0.780 cent. This average for the preceding year was 0.763 cent. Earnings per train mile show an increase for passenger but a decrease for freight trains. The ratio of operating expenses to earnings, 67.79 per cent., also increased in comparison with the preceding year, when it was 66.16 per cent.

Gross earnings from the mileage fully reported, were $1,975,174,091, being $74,327,184 greater than for the previous year. Operating expenses were $1,338,896,253, or $81,357,401 more than in 1903. The following figures give gross earnings in detail, with the increase of the several items as compared with the previous year: Passenger revenue, $444,326,991—increase, $22,622,399; mail, $44,499,732—increase, $2,790,336; express, $41,875,636—increase, $3,543,672; other earnings from passenger service, $10,914,746—increase, $1,093,469; freight revenue, $1,379,002,693—increase, $40,982,667; other earnings from freight service, $4,568,282—increase, $101,257; other earnings from operation, including unclassified items, $49,986,011—increase, $3,193,384. Gross earnings from operation per mile of line averaged $9,306, the corresponding average for the year 1903 being $48 less.

The operating expenses were assigned as follows: Maintenance of way and structures, $261,280,454; maintenance of equipment, $267,184,739; conducting transportation, $758,238,681; general expenses, $51,579,196; undistributed, $613,183. Operating expenses were $6,308 per mile of line, having increased $183 per mile in comparison with the preceding year.

Net earnings amounted to $636,277,838, a decrease of $7,030,217. Net earnings per mile for 1904 averaged $2,998; for 1903, $3,133, and for 1902, $3,048. The amount of income obtained from other sources than operation was $212,933,990. The total income was $849,211,828. Deductions for fixed charges, etc., aggregated $570,425,902, leaving $278,785,926 as the net income for the year available for dividends or surplus. The amount of dividends declared during the year (including $115,546, other payments from net income) was $222,056,595, leaving as the surplus from the operations of the year ending June 30, 1904, $56,729,331, that of the previous year having been $99,227,469.

The foregoing figures, being compiled from the annual returns of leased roads as well as of operating roads, necessarily include duplications in certain items of income and also of expenditure.

ACCIDENTS.

The total number of casualties to persons on the railroads for the year ending June 30, 1904, was 94,201, of which 10,046 represented the number of persons killed and 84,155 the number injured. Casualties occurred among three general classes of employees, as follows: Trainmen, 2,114 killed and 29,275 injured; switch tenders, crossing tenders, and watchmen, 229 killed, 2,070 injured; other employees, 1,289 killed, 35,722 injured. The casualties to employees coupling and uncoupling cars were: Employees killed, 307; injured, 4,019. The casualties connected with coupling and uncoupling cars are assigned as follows: Trainmen killed, 269; injured, 3,506; switch tenders, crossing tenders, and watchmen killed, 23; injured, 420; other employees killed, 15; injured, 93.

The casualties due to falling from trains, locomotives, or cars in motion were: Trainmen killed, 457; injured, 4,757; switch tenders, crossing tenders, and watchmen killed, 25; injured, 301; other employees killed, 75; injured, 570. The casualties due to jumping on or off trains, locomotives, or cars in motion were: Trainmen killed, 116; injured, 3,926; switch tenders, crossing tenders, and watchmen killed, 14; injured, 278; other employees killed, 61; injured, 506. The casualties to the same three classes of employees in consequence of collisions and derailments were: Trainmen killed, 613; injured, 4,337; switch tenders, crossing tenders, and watchmen killed, 20; injured, 138; other employees killed, 90; injured, 854.

The number of passengers killed in the course of the year 1904 was 441 and the number injured 9,111. In the previous year 355 passengers were killed and 8,231 injured. There were 262 passen-

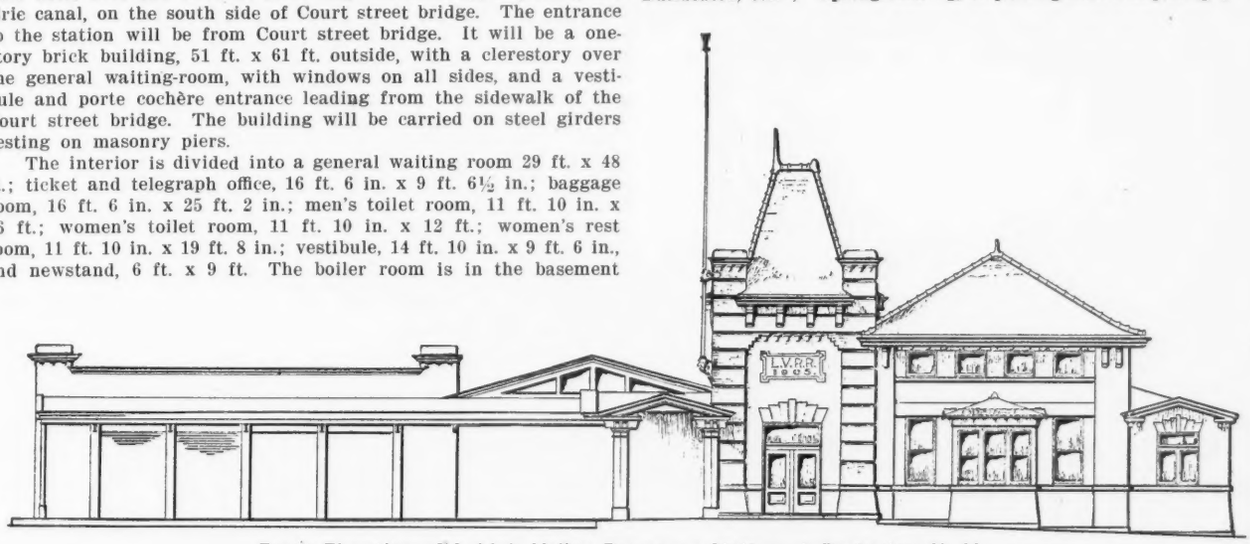
gers killed and 4,978 injured because of collisions and derailments. The total number of persons, other than employees and passengers, killed was 5,973; injured, 7,977. These figures include the casualties to persons classed as trespassing, of whom 5,105 were killed and 5,194 were injured. The total number of casualties to persons other than employees from being struck by trains, locomotives, or cars was 4,749 killed and 4,179 injured. The casualties of this class were as follows: At highway crossings, passengers killed, 4; injured, 10; other persons killed, 804; injured, 1,453; at stations, passengers killed, 28; injured, 108; other persons killed, 458; injured, 525; at other points along track, passengers killed, 9; injured, 38; other persons killed, 3,446; injured, 2,045.

In 1904 one passenger was killed for every 1,622,267 carried, and one injured for every 78,523 carried. For 1903 the figures show that 1,957,441 passengers were carried for one killed, and 84,424 passengers were carried for one injured.

New Passenger Station of the Lehigh Valley at Rochester, N. Y.

The Lehigh Valley is building a new passenger station at Rochester, N. Y. The station and approach is an elevated structure built over the Genesee river and the raceway, adjoining the Erie canal, on the south side of Court street bridge. The entrance to the station will be from Court street bridge. It will be a one-story brick building, 51 ft. x 61 ft. outside, with a clerestory over the general waiting-room, with windows on all sides, and a vestibule and porte cochère entrance leading from the sidewalk of the Court street bridge. The building will be carried on steel girders resting on masonry piers.

The interior is divided into a general waiting room 29 ft. x 48 ft.; ticket and telegraph office, 16 ft. 6 in. x 9 ft. 6½ in.; baggage room, 16 ft. 6 in. x 25 ft. 2 in.; men's toilet room, 11 ft. 10 in. x 16 ft.; women's toilet room, 11 ft. 10 in. x 12 ft.; women's rest room, 11 ft. 10 in. x 19 ft. 8 in.; vestibule, 14 ft. 10 in. x 9 ft. 6 in., and newstand, 6 ft. x 9 ft. The boiler room is in the basement and the coal bins are hung from girders under the building. The clear height of the general waiting room is 21 ft. 4 in. and of all other rooms about 11 ft.



Front Elevation of Lehigh Valley Passenger Station at Rochester, N. Y.

All platforms around the station will be of concrete and covered, except the extension of the Court street bridge concrete sidewalks in front of the building. The platform along the east side of the building will be 16 ft. wide, and on the south side or rear of building 18 ft. 6 in. wide. There will be a neat pipe railing around all platforms.

The viaduct track approach and train shed will be carried on a steel bridge construction resting on stone walls and piers built along the river and in the raceway. The train shed platform will be of wood, 365 ft. long, with a wooden umbrella canopy roof 305 ft. long. The canopy will be 13 ft. wide. The viaduct approach will be 566 ft. long. There will be a driveway or court-yard about 60 ft. x 70 ft., leading in from Court street bridge. The driveway will have asphalt finish on a concrete bed supported by steel girders resting on masonry piers.

The express building will be a one-story brick building, 28 ft. x 50 ft., with a concrete platform 11 ft. wide in front of it. The exterior of the passenger station will be built of dark mottled buff pressed brick, with a battered base of rock faced dark red vitrified paving blocks, with blue stone water table and sill course. Keystones of arches, lintels and sills will be dressed blue stone. The tower finials and trim will be terra cotta. The roof of the main building will be slate, with copper flashing, and the exterior finish of the express building will be similar to that of the main building.

The interior finish of the passenger station will be plastered walls with quarter-sawed oak wainscoting and trim. The ceiling of the general waiting-room will be a beamed ceiling with ornamental composition consoles. Floors will generally be maple except in the vestibule and toilet rooms, where there will be a concrete marble chip terrazzo floor. The interior of the building will be well lighted by windows at each end of the general waiting-room and upper lights in the clerestory. The lighting at night will be by electric fixtures. The building will be heated by steam from a boiler in the basement under the east side of the main building.

Mr. F. D. Hyde, 7 East 42d street, New York City, designed the station, has the contract for its construction, and also the approach. It is expected that the new station will be placed in use by next December.

The Thirteenth Annual Convention of the National Railroad Master Blacksmiths' Association.

The National Railroad Master Blacksmiths' Association, which will be known hereafter as the International Railroad Master Blacksmiths' Association, held its annual convention in Cleveland, Ohio, August 15-17. The attendance was larger than at any previous meeting. President Keane called the meeting to order and Mayor Tom Johnson welcomed the organization to the city. A donation of $200 was received from W. W. McLelland, of Denver, who is a retired blacksmith, having worked for the Denver & Rio Grande for many years. The following officers were elected: President, David B. Swinton, Canadian Pacific, Montreal, Canada; First Vice-President, John S. Sullivan, P., C., C. & St. L. Ry., Columbus, Ohio; Second Vice-President, G. H. Judy, B. & O. R. R., Pittsburg, Pa.; Chemist, G. H. Williams, B. M. Jones & Co., Boston, Mass.; Secretary and Treasurer, A. L. Woodward, C., H. & D. Ry., Lima, Ohio. Papers on the following subjects were read: "Forging Machine Formers, Bulldozers, etc."; "Spring Making, Repairing and Tempering"; "Oil Furnaces"; "Manipulating Tool Steel, Including High-Speed Varieties"; "Tools and Formers for Steam Hammers"; "Best Material and Methods of Forging Motion Work"; "Ideal Blacksmith Shop"; "Best Methods of Repairing Locomotive Frames, Both Iron and Steel"; "Best Methods of Testing Materials and Selecting Same for Uses Intended."

Train Accidents in the United States in July.[1]

bc, 1st, 1 a.m., Seaboard Air Line, Franklinton, Va., butting collision of freight trains; one conductor killed.

xc, 1st, 1 a.m., Southern Pacific, Winnemucca, Nev., westbound passenger train No. 5 collided with a freight train in the yard, wrecking an engine and seven freight cars; 12 persons were injured.

rc, 2d, 1 a.m., Southern Railway, Spartanburg, S. C., a freight train approaching the station at uncontrollable speed ran into the rear of a preceding freight, making a bad wreck. One trainman was killed and two others were injured.

bc, 4th, Louisville & Nashville, Viley, Ky., butting collision between an eastbound L. & N. passenger train and a westbound passenger train of the Chesapeake & Ohio, damaging both engines and several cars; 22 persons were injured. The trains were near their appointed meeting place, and it is said that the westbound (not scheduled to stop) was a minute ahead of time.

xc, 4th, Chicago & North-Western, Escanaba, Mich., collision of

[1]Accidents in which injuries are few or slight and the money loss is apparently small, will, as a rule, be omitted from this list. The official accident record, published by the Interstate Commerce Commission quarterly, is regularly reprinted in the *Railroad Gazette*. The classification of the accidents in the present list is indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Derailments; defects of roadway.
eq	Derailments; defects of equipment.
dn	Derailments; negligence in operating.
unf	Derailments; unforeseen obstruction.
unx	Derailments; unexplained.
o	Miscellaneous accidents.

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

switching freight trains, due to a misplaced switch; one trainman killed, two injured.

xc, 5th, Boston & Maine, Wachusett, Mass., an eastbound freight train approaching the station at uncontrollable speed collided with another freight which was switching, and both engines and many cars were wrecked. Three trainmen were killed and two injured.

dn, 5th, Rio Grande Western, Park City, Utah, a passenger train was derailed at a misplaced switch and the fireman was killed.

dn, 5th, 11 p.m., Buffalo Creek Railroad, Buffalo, N. Y., a switching engine of the Pennsylvania road ran into an open draw and fell into the Blackwell canal. Three men were carried down with the engine beneath the water, and were injured, being nearly drowned, and a fourth was injured by falling from the tender to the bridge.

*unx, Great Northern, Spring Brook, N. Dak., a passenger train was derailed and most of its cars were wrecked. Thirty passengers and several trainmen were injured, one of the latter fatally. Several passenger cars took fire and were burned up. It is said that the fire was started by the explosion of the gas tank under the smoking car. Many of the injured persons were somewhat burned by the fire, being unable to get out of the wreck until after some delay.

*rc, 8th, 4 a.m., Pennsylvania road, Marion, N. J., a freight train which had been unexpectedly stopped was run into at the rear by a following freight, and the caboose and several cars were wrecked. Three trainmen were killed and two injured. The wreck took fire and the city fire department had to be called out to extinguish the flames. There was a dense fog at the time, and the engineman of the approaching train claims that he saw the automatic block signal indicating all right.

xc, 9th, Cleveland, Cincinnati, Chicago & St. Louis, Oakalla, Ind., an eastbound passenger train running at high speed, collided with a freight train which was entering a side track. One engine and two cars were ditched. The fireman and the engineman of the passenger train were injured, the former fatally.

xc, 9th, Long Island road, Long Island City, N. Y., collision between a westbound passenger train and a switching engine. Three passengers and one trainman were injured.

dn, 10th, Louisville & Nashville, Lexington, Ky., passenger train No. 16 was derailed by a misplaced switch, and five passengers were injured.

xc, 11th, Southern Ky., Citico, Tenn., collision of freight trains; one employee killed and one fatally injured.

bc, 11th, Southern Railway, Tryon, N. C., butting collision of freight trains, wrecking both engines and 14 cars. Four trainmen and two other persons were injured.

xc, 11th, Pennslyvania Lines, Allegheny, Pa., collision between a passenger train and a freight train in the yard; three trainmen and one passenger injured.

unx, 13th, 3 a.m., Texas & Pacific, Marshall, Tex., the tender of the engine of passenger train No. 104 was derailed and, with the express car, broke through a bridge. Two express massengers were injured.

†xc, 14th, Chicago & Eastern Illinois, Steiger, Ill., a northbound through passenger train ran over a misplaced switch and into a suburban passenger train, wrecking one passenger car of the latter. The engineer of the suburban train and two passengers were killed and six persons were injured.

bc, 15th, Louisville & Nashville, Upton, Ind., butting collision of freight trains, wrecking both engines and many cars. Four trainmen were killed and eight persons were injured. The collision was due to confusion in sending train orders.

eq, 15th, Pere Marquette, Cheboyganing, Mich., the tender of the engine of a passenger train (the engine running backwards), was derailed while moving at about 40 miles an hour, and the engine and tender were ditched. The engineman was killed and the fireman injured. It is said that the derailment was due to a loose wheel.

bc, 16th, 4 a.m., Norfolk & Western, Midvale, Va., butting collision of freight trains, each drawn by two engines, wrecking all four engines and several cars. One brakeman and one fireman were killed and four other trainmen were injured.

unf, 16th, Southern Pacific, Landry, La., a freight train was derailed at a switch which had been maliciously misplaced, and the engine and 12 cars were ditched. The engineman was killed and two trainmen were fatally injured.

unx, 16th, Gulf, Colorado & Santa Fe, Buckholts, Tex., a freight train was derailed and the engine and 12 cars were ditched. One brakeman was fatally injured.

bc, 18th, Atchison, Topeka & Santa Fe, Romeo, Ill., butting collision between a passenger train and a freight; one express messenger killed and three trainmen injured. The smoking car of the passenger train, which was next to the engine, was completely wrecked and the 20 passengers riding in it were injured, but none very seriously.

xc, 18th, 4 a.m., New York Central & Hudson River, East Rochester, N. Y., a westbound passenger train collided with a freight train which was backing through a cross-over track and the engineman and fireman of the passenger train were injured, the former fatally.

eq, 18th, Chicago, Rock Island & Pacific, Phillipsburg, Kan., westbound passenger train No. 41 was derailed, presumably by something dropping on the track from a truck of one of the passenger cars, and four passengers were injured.

dn, 18th, Norfolk & Western, Prospect, Va., an excursion train was derailed at a point where the track was being repaired and where, it is said, the man in charge of the work neglected to give a caution signal, and six cars were ditched. Five passengers were injured.

unx, 18th, Oregon Railroad & Navigation, Umatilla, Wash., a freight train was derailed at a switch and the engine was overturned. Two cars of the train fell from a bridge to the ravine below, and a tramp, sitting on the bank of the river, was killed.

bc, 20th, 4 a.m., Pennsylvania road, Mocanaqua, Pa., butting collision of freight trains, damaging both engines and several cars. One fireman was killed and one engineman was injured. One of the trains appears to have run beyond the switch at the appointed meeting station.

xc, 21st, New York, New Haven & Hartford, Worcester, Mass., a passenger train collided with a freight train; two passengers injured, one of them fatally.

unf, 21st, Southern Pacific, Dryden, Tex., a westbound passenger train was derailed and wrecked, and the engineman and fireman were killed. It is said the derailment was due to malicious loosening of the rails.

bc, 22d, Louisville & Nashville, Pulaski, Tenn., butting collision of freight trains; one fireman killed; three other trainment injured, one of them fatally.

unx, 22d, Alabama Great Southern, Whitney, Ala., northbound passenger train No. 2 was derailed and six trainmen and 10 passengers were injured.

unf, 23d, Pennsylvania road, Duncansville, Pa., a freight train was derailed by running over a cow, and a brakeman was killed.

*unx, 23d, Chicago, Rock Island & Pacific, Unionville, Iowa, a freight train was derailed, making a bad wreck. A car of oil took fire and exploded, and with 14 other cars was burned up. Three trainmen were killed.

unx, 26th, Central of Georgia, Atlanta, Ga., a freight train was derailed and an engine and five cars were wrecked. Three trainmen were killed and two seriously injured.

unf, 27th, Northern Pacific, Myers, Mont., a freight train was derailed at a bridge which had been undermined by a flood, and the engine and four cars fell into the stream. Four trainmen were killed.

unx, 27th, Gulf, Colorado & Santa Fe, Silsbee, Tex., the tender of the engine of a freight train was derailed near a bridge and, with one span of the bridge and seven cars, fell to the stream below. One trainman was killed and one injured.

bc, 28th, Central Illinois Traction Company's Line, Mattoon, Ill., butting collision of passenger cars, both going at good speed. Both cars were wrecked and the motorman and 14 passengers were injured.

unx, 28th, Southern Railway, Jellico, Tenn., the locomotive of a freight train, running tender first, was derailed and wrecked and the fireman was killed. The engineman was seriously scalded.

*dn, 29th, St. Louis, Iron Mountain & Southern, Diaz, Ark., passenger train No. 5 was derailed at a misplaced switch. The engine was overturned and several of the cars took fire and were burned up. The engineman and fireman were killed and five trainmen and four passengers were injured.

unf, 29th, Pere Marquette road, Alpine Mich., a passenger train was derailed at a washout, and the baggage car and four passenger cars were ditched.

unx, 29th, 3 a.m., Little Rock & Fort Smith, Ozark Junction, Ark., a passenger train was derailed and the passenger cars fell down a bank; 42 passengers were injured.

†unx, 29th, Atchison, Topeka & Santa Fe, Lemont, Ill., a passenger train was derailed and one passenger car was wrecked. One passenger was killed and 20 injured, two of them fatally.

unf, 30th, Wheeling & Lake Erie, Forest City Park, Ohio, a freight train was derailed by sand which had been washed upon the track, and several cars were wrecked. The fireman was killed and the engineman was injured.

unf, 30th, St. Louis, Iron Mountain & Southern, Cotter, Ark., a train, consisting of a locomotive and caboose, was derailed at a washout and fell 25 ft. to the stream below. One employee was killed and five were injured.

xc, 31st, Chicago, Rock Island & Pacific, Joliet, Ill., a passenger train ran over a misplaced switch and collided with a work train on a gravel-pit track. One passenger car was badly damaged and four passengers and one employee were injured.

xc, 31st, Atlantic Coast Line, Bainbridge, Ga., collision between a freight train and a switching freight train; engineman and one brakeman killed.

GENERAL NEWS SECTION

NOTES.

The New York Central will close its station at Crane's Village, a small place on the main line near Amsterdam. The passengers formerly using that station, at which six trains stopped daily, have been traveling on the trolley line passing through the village instead of on the railroad. The receipts of the station dropped to $4 a month.

The Long Island Railroad will continue its summer time-table until September 20 instead of substituting a new fall time-table with fewer trains on the first Wednesday after Labor Day, as has been done in previous years. The reason given is that the summer resorts on Long Island promise to have a longer season than ever before and that the residents are planning to stay late into the month. The traffic this year has been very heavy.

Just as the movement of the grain crop is about to begin, the Great Northern announces a large reduction in grain rates throughout its eastern territory as far as the boundary of Montana. This reduction ranges from 5 cents a hundred from the most distant points to ½ a cent from points nearest St. Paul and the head of navigation on the Great Lakes. It will be recollected that considerable reductions were made on the western section of the road three years ago.

According to current estimates, about 250,000 tons of steel in different shapes will be required for railroad cars now building or ordered. Contracts placed for soft steel bars since the first of August are said to aggregate about 130,000 tons. Most of these are contracted for by the United States Steel Corporation, for fall delivery. Since the first of August the Pacific lines are said to have ordered 112,000 tons of rails, while purchases by all other railroads during August have brought the total tonnage up to 213,000.

The Great Central Railway of England, following the example set by a number of other roads, has commenced publication of a journal of its own, designed primarily for employees. The idea is to build up an *esprit de corps* and keep all branches of the service interested in the working of the organization of which they are a part. The first issue contains an illustrated article about the General Manager, Mr. Sam Fay; interviews with Mr. E. A. Clear, Assistant Goods Manager, and Mr. Conradi, District Engineer; district notes, etc.

Secretary of Agriculture Wilson has approved the recommendation of Chief Salmon, of the Bureau of Animal Industry, that the recently adopted regulations under the 28-hour law regarding the shipment of cattle be withdrawn. Until further orders any cars equipped with feeding and watering facilities may be used, without unloading, provided the cattle can and do receive food and water en route. The number of cattle loaded in a car will be left to the shippers, but such loading shall not exceed the minimum weight, as provided in the classification of the transportation companies.

Lecture Course of the Pennsylvania Railroad's Y. M. C. A.

The Pennsylvania Railroad Branch of the Young Men's Christian Association in Philadelphia will give a series of 39 lectures on railroad topics during the coming winter. The course of lectures given last winter on "Railroad Transportation" was so successful that this year's plans have been made along the same but broader lines. The experiment last year showed the value of the course in giving railroad men a broader general knowledge of the location, traffic, policies and methods of operation of the railroads of the country and a more intimate knowledge of the Pennsylvania Railroad, not only as to its history and present status, but especially as to its methods of conducting the business of the various departments.

Among the more important of the lectures to be given this year will be: "Growth and Functions of the Executive Department," by Secretary Lewis Neilson; "Financing the Pennsylvania Railroad," by First Vice-President John P. Breen; "General Accounting," by Comptroller Max Riebenack; "Freight Traffic," by Freight Traffic Manager George D. Dixon; "Development of the Passenger Business," by General Passenger Agent George W. Boyd; "Organization of Motive Power Department in Relation to Road Organization," by Superintendent of Motive Power A. W. Gibbs; "Maintenance of Way Standards," by Chief Engineer of Maintenance of Way Joseph T. Richards; "Purchase of Supplies," by Purchasing Agent D. S. Newhall; "Functions and Growth of the Real Estate Department," by Real Estate Agent B. W. Carskaddon; "Engineering," by Assistant Chief Engineer A. C. Shand; "Functions and Growth of the Legal Department," by Assistant General Solicitor George Stuart Patterson; "Functions and Growth of the Insurance Department," by Superintendent Hugh B. Ely. During the course these general subjects will be sub-divided and treated by other Pennsylvania officials thoroughly familiar with the respective subjects. Colonel Frank N. Barksdale, the advertising manager of the company, will give a talk on advertising.

The Ethics of Cut Rates.

The cut rate is designed to make a competitor, or competitors, lose money, generally on the transportation of some specific commodity. It has never been claimed by the railroad officials that such concessions were a remedy for abuses. The cut rate is simply a form of revenge, designed to cause trouble. When it spreads to commodities, the railroad officials who were responsible for it in the first instance are generally found to "deeply regret" it. There is a great difference between the open cut rate and the "midnight tariff." The former is published and filed in Washington. The latter is an attempt to break the law without being caught, or to evade the law, which requires the filing of all rates at Washington. Both the sugar rate war and the differential rate war were open tariffs, and were not violations of any law. The New Orleans lines filed low tariffs on sugar out of New Orleans against the trunk lines out of New York, and the Michigan Central and Grand Trunk openly filed the low rates between Chicago and New York. There have always been losses on cut rates, but in most cases the published reports are grossly exaggerated. Chicago is talking just now of "millions lost" in the sugar rate war. As a matter of fact, the net loss to all railroads on this tariff was probably below $100,000. The rough estimates of the cost of the "passenger differential war" are similarly padded.—*Evening Post*, New York.

How Ticket Scalpers Are Handled in Texas.

It is not frequently that railroad companies print in book form for public distribution the proceedings in a trial at court in which they are interested, but that is what the passenger department of the Southern Pacific, of which T. J. Anderson is General Passenger Agent, has done in one particular case. The book contains 59 pages and is a complete report of the important portions of the case of the Galveston, Harrisburg & San Antonio Railway et al. vs. Sam Alexander et al., injunction. The voluminous petition of the railroad companies for an injunction in the action against Mr. Alexander and other ticket scalpers is given in full. It sets forth in vigorous English the injuries the railroads suffer from ticket scalping and the infringement on their natural and legal rights by reason of such practices. Also the rulings in full of Judge Norman G. Kittrell, of the Sixty-first district court, in which the cause was heard, including the final decree, are reprinted. This case was the undoing of the scalper in Texas and decision in it has been used as a precedent in the courts of many other states in similar actions. The books are being freely distributed, especially in portions of the country where scalping still flourishes. General Passenger Agent Anderson has been the commander-in-chief in the fight against the scalper. His energetic campaign has not only wiped scalping out of most of Texas, but has been an inspiration for passenger heads of other railroads to take up the cudgel and put on the war paint. The war on the scalper is not yet over, notwithstanding victories have been achieved in the most important centers. Strongholds still exist and there are a few scattered outposts in Texas. The "law reporter" which Col. Anderson has gotten out will undoubtedly hasten the general victory wherein scalping will be no more. The front cover of the book bears the following words: "How Scalpers Are Handled in Texas. Go Thou and Do Likewise."—Houston, Tex., *Chronicle*.

Air Compressor for an Arizona Mine.

The Calumet & Arizona Mining Co., Bisbee, Ariz., is installing a Sullivan Corliss cross-compound steam two-stage air compressor, with a total piston displacement of 3,660 cu. ft., which, on account of the altitude at which the compressor operates, is equivalent to an actual delivery capacity of 2,700 cu. ft. of free air per minute, against a terminal pressure of 100 lbs. per sq. in., while running at 83 r. p. m. This machine is expected to attain a high efficiency, being designed to run condensing, and to operate when carrying its most economical load on 15.2 lbs. of dry steam per i. h. p. per hour. The steam cylinders are 17 in. and 34 in., and air cylinders, 20 in. and 34 in. in diameter, with a common stroke of 42 in. Rolling inlet valves controlled by independent eccentrics are used on both the high and low pressure air cylinders. Rolling discharge valves are also used on the low pressure air cylinder. In addition to these, a number of automatic discharge valves are used on the same cylinder. The high pressure air cylinder is equipped with a full set of removable automatic poppet discharge valves, which act in a direction parallel with the steam piston rod. An interesting feature is the automatic oiling system, which lubricates all the working parts regularly and without the attention of the engineer. The machine

will be used for operating rock drills and other pneumatic tools about the mines. This company already has three class WB-2 Sullivan straight-line compressors, giving a total air supply of about 5,700 cu. ft. per minute. The Sullivan Machinery Co., Chicago, is the builder of these compressors.

Fighting for Right-of-Way in New Orleans.

Press dispatches from New Orleans, La., on August 20, reported a strenuous battle between employees of the Illinois Central and the New Orleans Terminal Company for the possession of a disputed strip of right of way along the Illinois Central's yards. The Terminal Company attempted to lay tracks on the land which it claimed had been granted to it by the City Council. When a force of 45 of the company's men appeared on the morning of August 20 with tools and material to lay track they were met by 500 employees of the Illinois Central and driven off, and their material confiscated. The police were called on, but were ejected in the same unceremonious manner. Work was resumed later under heavy police guard, and then the Illinois Central is reported to have backed in a gravel train and dumped the gravel over on the contested property. It was removed, and the track laying continued. As a last resort an attempt was made to wreck a train of freight cars and block the track-laying operations with the mass of debris by undermining the track alongside of the battleground. The cars left the rails, but did not interfere with the Terminal Company's continuing work. The Illinois Central finally gave up the fight after 90 of its employees had been arrested on various charges of assault and disorderly conduct.

Georges Nagelmackers.

Georges Nagelmackers, the founder and General Manager of the International Sleeping Car Co., which in a small way is the Pullman Co. of continental Europe, died last July in Belgium, at the age of 61. He was born in Liege, where his father was a banker. After finishing engineering studies he spent some time in the United States, and on his return to Europe, interested some friends in the construction of a single sleeping car, which he succeeded in attaching to a train running between Brussels and Cologne. Encouraged by its success, Nagelmackers organized the International Sleeping-Car Co. in 1876, which made contracts for running its cars, and now for a long time entire trains on many of the most important long routes in Europe, and latterly in Asia, as from Paris to Lisbon, Paris to Constantinople, Moscow over the Siberian Railroad to Irkutsk, a line which would have been extended to Port Arthur but for the Japanese war; and many others. The company also built and conducted some of the most luxurious hotels in the world, chiefly at winter resorts—an enterprise which has so far been unprofitable. Nagelmackers left a son, René, who is one of the directors of the company.

New President of the Master Blacksmiths' Association.

Mr. David B. Swinton, the newly elected President of the International Railroad Master Blacksmiths' Association, was born at Hadlow, Ont., and commenced his career in his father's shop at that place. At the age of 18 he began work with the Credit Valley R. R. Co. at Toronto, a few years later entering the service of the Canadian Pacific R. R. at Montreal in the locomotive department, afterward being promoted to the position of Master Blacksmith of the car department, which position he now holds. Mr. Swinton, though young, is a man of broad experience, and is popular with those employed under him.

Tramway Competition in England.

Lord Allerton told the Great Northern Railway meeting on August 11 that electric tramway competition during the half year had been a serious matter for the company. In Yorkshire owing to further extension of tramways, it had carried 350,000 fewer passengers. The new service of tram cars in London had affected its short-distance traffic betwen Hornsey, Wood Green, Harringay and Finsbury Park, at which stations the falling off had been 150,000 passengers.

Performance of an Allfree-Hubbell Locomotive.

Central Railroad of New Jersey locomotive 581, equipped with the Allfree-Hubbell valve gear, was described in the *Railroad Gazette* June 9, 1905, as was its performance in competition with a companion locomotive having the usual valve gear. On July 23d this locomotive hauled a five-car train from New York to Philadelphia, 92.8 miles, in one hour and 58 minutes without taking water. The train made the regular stops and three slow-downs, the average speed being 47.18 m.p.h. The tank holds 5,000 gals. and on arrival at destination still had 6 in. of water in it.

Master Car Builders' and Master Mechanics' Conventions.

The next place of meeting of the annual conventions of the Master Car Builders' and Master Mechanics' Associations convention will be determined by the following committee: A. E. Mitchell, S. M. P., L. V. R. R. Co., with office at South Bethlehem, Pa.; G. W. Wildin, Mechanical Superintendent, Erie R. R. Co., with office at Meadville, Pa.; F. K. Shults, representing the Supply Men's Association, 95 Liberty street, New York City.

The above mentioned committee has appointed Mr. F. K. Shults Chairman, and all communications should be addressed to him, care Camel Company, 95 Liberty street, New York City.

Temporary Hoboken Terminal.

The Lackawanna has practically completed a temporary terminal at Hoboken, N. J., to replace the one destroyed by fire August 7. The estimated cost of this temporary work is about $100,000, and it is understood that this cost, together with that of removing this same structure to make room for the permanent one later on, will represent the chief actual loss from the fire, as the old buildings would have been torn down as soon as possible. It is no doubt a considerable convenience to the company to have them removed in this summary manner.

New Honolulu Record.

The Pacific mail steamship Siberia has made a new record between San Francisco and Honolulu, making the run in 4 days, 19 hours and 20 minutes, which is at the rate of 18.1 knots an hour. The best previous time was 4 days and 23 hours, approximately, made by the Korea, a sister ship of the Siberia, two years ago. These two vessels are both American build.

Coal Production in the United States.

The *Wall Street Journal* prints the following table of coal production in the United States since 1884:

	Bituminous and anthracite combined. tons.	Anthracite. tons.		Bituminous and anthracite combined. tons.	Anthracite. tons.
1904	351,196,953	73,156,709	1894	170,741,526	51,921,121
1903	357,356,416	74,607,068	1893	182,352,774	53,967,543
1902	301,590,439	41,373,595	1892	179,329,071	52,472,504
1901	293,299,816	67,471,667	1891	168,566,669	50,665,431
1900	169,684,027	57,367,915	1890	157,770,963	46,468,641
1899	253,741,182	60,418,005	1889	141,229,513	45,546,970
1898	219,796,267	53,382,644	1888	148,659,657	46,619,564
1897	200,229,199	2,611,680	1887	130,650,511	42,088,197
1896	191,986,357	54,346,081	1886	113,680,427	39,035,446
1895	193,117,530	57,999,337	1885	111,160,295	38,335,974

The production, in tons, of bituminous coal in the principal soft coal states for a series of years compares as follows:

	1904.	1900.	1885.
Pennsylvania	97,916,733	79,842,326	26,000,000
Illinois	35,990,796	25,767,981	11,834,459
West Virginia	32,332,385	22,647,207	3,369,062
Ohio	24,415,054	18,988,150	7,816,179
Alabama	11,163,194	8,394,275	2,492,000
Indiana	10,929,908	6,484,086	2,375,000
Colorado	6,594,295	5,244,364	1,356,062
Kentucky	7,559,940	5,328,964	1,600,000
Iowa	6,542,005	5,202,939	4,012,575
Kansas	6,322,875	4,467,870	1,212,057
Maryland	4,819,171	4,024,688	2,833,337
Wyoming	5,177,381	4,014,602	807,328
Tennessee	4,782,302	3,509,562	1,440,957
Missouri	4,187,197	3,540,103	3,080,000
Virginia	3,576,092	2,393,754	567,000

Manufacturing and Business.

R. S. Cooper, former representative of the Rand Drill Co. at Pittsburg, Pa., has been appointed Manager of the New York office of the Independent Pneumatic Tool Co.

The American Bridge Co. is putting up new works at Athens, Pa., which it expects to have open by the first of October, and which will give employment to about 500 men.

The Canadian Pacific has purchased four large steam shovels from the Locomotive & Machine Co., of Montreal, Que. This is the largest order of the kind ever filled in Canada.

Jas. C. Hain, formerly Engineer of Masonry Construction of the Chicago, Milwaukee & St. Paul, is now connected with J. G. White & Co., Engineers and Contractors, 43 Exchange place, New York.

Announcement has been made that the Continental Iron & Steel Co. will soon build a large plant at East Rahway, N. J., in which, it is said, rails will be made. The Pennsylvania is thought to be back of this project.

P. F. Kobbe, Jr., announces his resignation as Advertising Manager of the Rand Drill Co., to engage in similar work elsewhere. Until October 1 his address will be at 11 Broadway, New York, and after that date at 1 Hudson street.

William T. Simpson, formerly with the Detroit Lubricating Co., and more recently with the American Locomotive Equipment Co., is now with the S. F. Bowser & Co., of Fort Wayne, Ind., maker of the Bowser oil storage systems and oil house equipments.

The Dayton Pneumatic Tool Co. is in the market for new drop forge dies for hammer handles, and will be pleased to hear from drop forge companies equipped for this class of work. All communications in regard to the matter should be addressed to their general offices at Dayton, Ohio.

Mr. Henry W. Toothe has resigned as Manager of the Railroad Department of the Magnolia Metal Co. to take a position with the A. C. Stiles Anti-Friction Metal Co., of New Haven, Conn. Mr.

Toothe will act as Manager of this company's Babbitt Department, with headquarters in New York City.

Walter E. Harrington has severed his connection as Vice-President and General Manager of the New York-Philadelphia Company to become associated with J. G. White & Company, of New York, as Operating Manager, in which position he will supervise all of the railway, electric lighting, gas and other properties operated by it, and will make his headquarters at the New York office of the company, 43 Exchange place.

The Erie Railroad Co. has awarded The Buffalo Forge Company, Buffalo, N. Y., contracts for heating and ventilating its new 42-stall roundhouse at Buffalo, N. Y.; its 43-stall roundhouse at Hornellsville, N. Y.; its 21-stall roundhouse at Galion, Ohio, and its 21-stall roundhouse at Huntington, Ind. The Fan system of heating ventillation will be used, and if the pipe in the heating apparatus of these installations were laid in one continuous length, the distance covered would be practically 6½ miles.

According to reports from Pittsburg, many of the mills and shops of the steel makers are to be enlarged and improved at an expenditure of over $25,000,000. Among the companies building new works are: The Carnegie Steel Co., at Braddock and at Homestead; Jones & Laughlin, at Pittsburg; American Steel & Wire Co., at Pittsburg and at Rankin; National Tube Co., at Pittsburg and at McKeesport; McClintic-Marshall Construction Co., at Pittsburg; Mesta Machine Co., at Pittsburg, and Pittsburg Steel Co., at Monessen.

At the annual meeting of the stockholders of the Locomotive Appliance Co., which was held at their offices, Old Colony Building, Chicago, August 10th, the following directors were elected for the ensuing year: J. H. McConnell, Pittsburg, Pa.; E. B. Lathrop, Frank W. Furry, Ira C. Hubbell, J. B. Allfree, Willis C. Squire and J. J. McCarthy, Chicago; W. J. McBride, Clarence H. Howard, B. F. Hobart and C. A. Thompson, St. Louis, Mo. J. H. McConnell, who succeeds G. W. Cale, Jr., was formerly connected with the Union Pacific for a number of years, and more recently Manager of the Pittsburg Works of the American Locomotive Co.

Iron and Steel.

The Vanderbilt Lines, it is said, have placed orders for rails amounting to 160,000 tons for 1905 delivery.

The United States Steel Corporation, it is said, has arranged to buy between 30,000 and 40,000 tons of Bessemer pig iron for September delivery.

The orders for rails recently placed with the United States Steel Corporation by the Harriman Lines aggregate about 75,000 tons. The contracts recently placed by the Union Pacific and the Southern Pacific aggregate about 86,000 tons. The Chicago, Burlington & Quincy is in the market for 15,000 tons for 1905 delivery, and the Frisco System for 25,000 tons for 1906 delivery.

PERSONAL.

—Mr. John H. Davis, for many years Master Car Builder of the Atlantic Coast Line at Wilmington, N. C., died at that place on August 17 at the age of 47. Mr. Davis was born in Charlotte, N. C., and came to the Wilmington shops of the Atlantic Coast Line as an apprentice in 1875 at the age of 17, becoming, in 1884, Master Car Builder after a series of promotions.

—Mr. George H. Thompson, City Passenger Agent of the Pittsburg & Lake Erie, died in Pittsburg on August 17 at the age of 33. Mr. Thompson was born at Cleveland, Ohio, where he entered the service of the Lake Shore & Michigan Southern. In 1893 he was appointed Traveling Passenger Agent of the Pittsburg & Lake Erie, holding this position until 1902, when he was appointed City Passenger Agent.

—Mr. James B. Smalley, who has recently been appointed Superintendent of the Kansas division of the Chicago, Rock Island & Pacific, with headquarters at Topeka, Kan., began his railroad work with the Chicago, Milwaukee & St. Paul at Muscoda, Wis., studying telegraphy. After a short apprenticeship he went into the general freight office of the same road at Milwaukee and was transferred two years later to become assistant despatcher and later was made train despatcher. Eight years after he was appointed chief despatcher at Dubuque, from which place he was transferred to Marion as chief despatcher of that division and later became Assistant Superintendent of the division. Two years later he was appointed to the position of Superintendent of the Dakota division, with headquarters at Estherville, where he remained only a few months. He was then transferred to Des Moines as Superintendent of the Iowa division, which position he leaves to take charge of the Kansas division.

—Mr. Charles W. Jones, the new Superintendent of the Iowa division of the Chicago, Rock Island & Pacific, was born at Milton, Ind., in 1858, and was educated at the Mitchellville Seminary. His entire railroad career has been spent with the Chicago, Rock Island & Pacific, having started as agent's helper at Mitchellville in 1876. After a short apprenticeship he was appointed operator. He continued this work from 1877 to 1881, and from that time to 1884 he was agent and operator at Atlantic, and from 1884 to 1890 was train despatcher in Des Moines. For two years he was chief despatcher at Davenport, where he also served as trainmaster for three years, and for a short time was Assistant Superintendent until his transfer in 1895 to Herrington, Kan., as Superintendent of that division. When the headquarters were transferred from that place to Topeka, he continued in the same capacity. He now leaves this position to go to the Iowa division of the same company.

ELECTIONS AND APPOINTMENTS.

Canadian Pacific.—See Panama Canal

J. M. R. Fairbairn has been appointed Acting Division Engineer of the Eastern Division, with headquarters at Montreal, succeeding D. MacPherson, resigned.

Chicago Great Western Railway.—E. E. Watson has been appointed Assistant General Freight Agent, succeeding W. E. Pinckney, promoted.

Chicago, Indianapolis & Louisville.—W. B. Jones has been appointed Superintendent of Transportation in charge of telegraph service, assignment and distribution of power and equipment used in freight and passenger service, with headquarters at Lafayette, Ind. L. H. Parker having resigned to engage in other business, the office of Superintendent is abolished. All matters which do not come within the jurisdiction of the Superintendent of Transportation, will hereafter be handled through the office of the General Superintendent.

Chicago, Milwaukee & St. Paul.—J. J. Harding, hitherto Assistant Engineer in charge of the drafting room of the bridges and buildings department, has been appointed Engineer of Masonry Construction, succeeding J. C. Hain, resigned. J. H. Pryor succeeds Mr. Harding.

Chicago, Rock Island & Pacific.—A. W. Kelso has been appointed Superintendent of the Chicago Terminal Division, succeeding W. G. Bierd, resigned.

C. H. Hubbell, Acting General Superintendent of the Central district, has been appointed General Superintendent of the Northern district, with office at Cedar Rapids, Iowa. H. S. Cable, formerly General Superintendent of the Northern district, has been appointed to the same position on the Central district, with headquarters at Davenport, Iowa.

Cincinnati, Hamilton & Dayton.—F. A. Sweeney, Trainmaster at Cincinnati, has been appointed Superintendent of the Wellston division, with headquarters at Wellston, Ohio, suceeding George Geiger, resigned.

Cleveland, Akron & Columbus.—J. H. Oglesby has been appointed Traveling Freight Agent, with temporary headquarters at Columbus, Ohio, succeeding C. M. Munhall, deceased.

Cleveland, Cincinnati, Chicago & St. Louis.—Charles Krotzenberger, General Agent, Passenger Department, with office at Columbus, Ohio, has been appointed to the newly created position of General Agent, Passenger Department, with headquarters at Cincinnati, reporting to the General Passenger and Ticket Agent. He is succeeded by C. C. Clark, formerly Central Passenger Agent at Cincinnati.

Delaware, Lackawanna & Western.—F. W. Williams, Master Mechanic at Buffalo, N. Y., has resigned.

Denver, Enid & Gulf.—W. B. Blanton, Assistant to the Vice-President and General Manager, has resigned.

Galveston, Harrisburg & San Antonio.—Colonel W. J. Craig has been appointed Division Freight and Passenger Agent, with headquarters at Victoria, Tex.

Lake Shore & Michigan Southern.—Harry F. Smith has been appointed General Car Foreman at the Collingwood, Ohio, shops.

Norfolk & Western.—W. S. Becker, Superintendent of the Norfolk division, with headquarters at Crewe, Va., has been appointed Superintendent of the Pocahontas division, with office at Bluefield, W. Va., succeeding M. J. Caples, resigned. Mr. Becker is succeeded by V. A. Riton, formerly Superintendent of the Shenandoah division. E. A. Blake has been appointed to succeed Mr. Riton as Superintendent of the Shenandoah division, with office at Roanoke, Va. James T. Carey, Trainmaster on the Scioto division, has been appointed Assistant Superintendent of the Pocahontas division.

Panama Canal.—J. G. Sullivan, Division Engineer of the Canadian

Pacific, has been appointed Assistant Engineer of Construction of the Panama Canal.

South & Western.—M. J. Caples, Division Superintendent of the Norfolk & Western, has been appointed General Manager of this company, with headquarters at Bristol, Va.

Tidewater.—F. F. Harrington, who was in the office of the Chief Engineer of the New York Central, has been appointed Engineer of Bridges, with headquarters at Norfolk, Va.

Wabash.—W. C. Maxwell, formerly Assistant General Freight Agent of the Chicago, Burlington & Quincy, with office at St. Joseph, Mo., has been appointed Assistant General Traffic Manager of the Wabash, with headquarters at St. Louis.

Wabash-Pittsburg Terminal.—John T. Walsh, Assistant Auditor, has resigned.

LOCOMOTIVE BUILDING.

The Cleveland, Cincinnati, Chicago & St. Louis has ordered 50 locomotives.

The New York, New Haven & Hartford is reported to have ordered 17 freight locomotives.

The Japanese Government has ordered 150 narrow gage locomotives from the Baldwin Locomotive Works.

The Rhaetische-bahn, a narrow gage railroad in Engadine, Switzerland, is reported as being in the market for 13 locomotives.

The Harriman Lines have ordered 72 simple Consolidation, 31 simple Atlantic, 10 simple Pacific and 23 switching locomotives from the Baldwin Locomotive Works.

The South Side Coal & Railway Company, Arkansas, on the completion of its line, will be in the market for three 85-ton freight locomotives. George D. Locke, Missouri Trust Building, St. Louis, is Vice-President of the company.

The Michigan Central is having a number of locomotives built by the Locomotive & Machine Co., of Montreal, Ltd. These engines are duplicates of those recently completed for the Michigan Central at the Schenectady shops of the American Locomotive Co. These are of the 2-8-0 C type, having the following dimensions: Cylinders, 23 in. and 35 in. in diameter x 32 in. stroke; eight drivers, 63 in. in diameter; driving wheel base, 17 ft.; total wheel base, 25 ft. 9 in.; weight on drivers, 175,000 lbs.; total weight, 199,000 lbs.; tank capacity, 14 tons of coal and 16,000 U. S. gallons of water; weight of tender when loaded, 128,000 lbs.

The Bangor & Aroostook has ordered five simple 10-wheel freight (4-6-0) locomotives from the American Locomotive Co., for spring 1906 delivery. These locomotives will weigh 144,500 lbs., with 111,500 lbs. on the drivers; cylinders, 20 in. x 26 in.; diameter of drivers, 62 in.; extended wagon top boiler, with a working steam pressure of 180 lbs.; heating surface, 2,052 sq. ft.; 277 charcoal iron tubes, 2 in. in diameter and 13 ft. 8 in. long; firebox, 96 in. x 41 in.; grate area, 27⅛ sq. ft.; tank capacity, 4,000 gallons, and coal capacity, seven tons. The special equipment includes: Westinghouse-American air-brakes, Sterlingworth brake-beams, Tower couplers, Dewey headlights, Hancock injectors, Ashton safety valves, Leach sanding devices, Detroit sight-feed lubricators and Krupp driving wheel tires.

The Louisiana & Arkansas has ordered four simple 10-wheel freight (4-6-0) locomotives from the Baldwin Locomotive Works, for August and September delivery. These locomotives will weigh 149,500 lbs., with 121,500 lbs. on the drivers; cylinders, 20 in. x 26 in.; diameter of drivers, 56 in.; straight top boiler, with a working steam pressure of 200 lbs.; heating surface, 2,306 sq. ft.; 316 charcoal iron tubes, 2 in. in diameter and 13 ft. long; steel firebox, 116¾ in. x 41⅛ in.; grate area, 33.3 sq. ft.; tank capacity, 5,000 gallons, and coal capacity, 10 tons. The special equipment includes: Westinghouse-American air-brakes, Tower couplers, Monitor injectors, More-Jones journal bearings, Jerome piston and valve rod packings, Leach sanding devices, Nathan sight-feed lubricators and French springs.

The Chicago, Burlington & Quincy, as reported in our issue of August 11, is building four simple switching (0-6-0) locomotives at its Havelock (Neb.) shops, for October delivery. These locomotives will weigh (estimated) 144,200 lbs.; cylinders, 21 in. x 26 in.; diameter of drivers, 52 in.; radial stay boiler, with a working steam pressure of 180 lbs.; heating surface, 2,366 sq. ft.; 254 Tyler iron tubes, 2¼ in. in diameter and 15 ft. long; steel firebox, 6 ft. x 5 ft.; grate area, 30 sq. ft.; tank capacity, 8,000 gallons, and coal capacity, 16 tons. The special equipment includes Westinghouse air-brakes, Crandall bell ringers, Melrose couplers, Sellers injectors, Economic piston and valve rod packings, Ashton safety valves, Michigan sight-feed lubricators, Crosby steam gages, Latrobe driving wheel tires, and Standard Steel Works tender wheel tires.

CAR BUILDING.

The Jamison Coal & Coke Co. is having 500 of its cars rebuilt.

The Mexican Central has ordered 20 passenger cars from Barney & Smith.

The Winona & Warsaw (Electric), Warsaw, Ind., is in the market for six cars.

The Chesapeake & Ohio will have several hundred of its freight cars rebuilt by the Illinois Car Co.

The Florida East Coast is in the market for 10 coaches, six baggage and express cars and one sleeping car.

The Nashville, Chattanooga & St. Louis, it is reported, will build 100 coal and 100 box cars at its own shops.

The Cleveland, Cincinnati, Chicago & St. Louis will have repaired several hundred cars by the Illinois Car Co.

The Green Bay Traction Company, of Green Bay, Wis., has ordered two interurban cars from the St. Louis Car Co.

Swift & Company will rebuild at its own shops 100 produce cars and are reported as being in the market for 100 stock cars.

The Missouri, Oklahoma & Gulf has ordered 10 box cars of 80,000 lbs. capacity from the American Car & Foundry Co.

The Havana Central (Electric) is reported as being in the market for several hundred cars to be used for general service.

The Orange & Northwestern has ordered 50 logging cars of 60,000 lbs. capacity from the Beaumont Iron Works, of Beaumont, Tex.

The Canadian Pacific intends building a large number of grain cars at its Montreal shops. It will also build 10 passenger coaches and 30 cabooses.

The Atchison, Topeka & Santa Fe has ordered 150 flat cars of 80,000 lbs. capacity from the Pressed Steel Car Co. They will be mounted on Barber trucks.

The Japanese Government has ordered 2,000 steel gondola cars, 1,000 from the Western Steel Car & Foundry Co. and 1,000 from the American Car & Foundry Co.

The Rhaetische-bahn, a narrow gage railroad in Engadine, Switzerland, is in the market for 62 cars of various sorts, and $78,000 has been set aside for their purchase.

The Central of Georgia is in the market for 500 steel hopper cars of 100,000 lbs. capacity, 250 flat cars of 80,000 lbs. capacity, and 250 steel hopper bottom gondola cars of 100,000 lbs. capacity.

The Seaboard Air Line, as reported in our issue of August 18, has ordered 500 plain box cars and 500 ventilated box cars of 80,000 lbs. capacity from the American Car & Foundry Co. The special equipment will include: Westinghouse air-brakes, Tower couplers, Symington journal boxes, Chicago old style roofs and Railway Steel Spring Co.'s springs.

The South Side Coal & Railway Company, Arkansas, will begin building its 50-mile road about October 1. On the completion of its line, the company will be in the market for the following equipment: Five hundred coal cars, 50 box cars, four passenger cars and three cabooses. The Vice-President of the company is George D. Locke, Missouri Trust Building, St. Louis.

The Atlantic Coast Line, as reported in our issue of August 11, has ordered 150 flat cars of 60,000 lbs. capacity from the South Atlantic Car & Manufacturing Co., for September delivery. These cars will be 40 ft. long and 9 ft. 2 in. wide, over all. The special equipment will include: Atlantic Coast Line standard brake-beams and brasses, Christie brake-shoes, Westinghouse air-brakes, Tower couplers, Thornburgh tandem draft rigging and Harrison dust guards.

The Mexican Railway, as reported in our issue of August 11, has ordered 50 gondola cars from the Pullman Co. These cars will be of 60,000 lbs. capacity and are for October delivery. They will weigh about 29,500 lbs., and measure 34 ft. long x 8 ft. 10 in. wide over sills. The special equipment includes: Pullman axles and brake-beams, American Steel Foundries' bolsters and trucks, Christie brake-shoes, Westinghouse air-brakes and draft rigging, Tower couplers and Soule dust guards.

The Atlanta & West Point has ordered four vestibule passenger cars from the St. Louis Car Co., for November delivery. These cars will be 74 ft. long, 9 ft. 8½ in. wide and 14 ft. 6 in. high, over all. The special equipment will include: Diamond special brake-beams, Westinghouse air-brakes, Ajax brasses, Buhoup couplers, National Lock Washer Co.'s curtain fixtures, Pantasote curtain material, Miner tandem draft rigging, Harrison dust guards, Gold heating system, McCord journal boxes, Pintsch light, Hale & Kilburn seats, Railway Steel Spring Co.'s springs, Pullman wide vestibules and Page wheels.

BRIDGE BUILDING.

ALLENTOWN, PA.—The Northampton County Commissioners have instructed County Engineer Cooper to prepare plans for a new bridge to be built over the Saucon creek at Shimersville.

ATLANTA, GA.—A resolution has been introduced in the City Council to authorize an appropriation of $15,000 to start the work on the Washington street viaduct.

BENTON HARBOR, MICH.—The Michigan Terminal Co., to secure an entrance for its proposed road into this place, offers to build a bridge over the Ship canal to cost $40,000.

BENTON, TENN.—The County Court, at a recent session, decided to build six new bridges; one each at Conasarga, Ducktown, and Reliance, and three near Benton, at a total cost of $40,000, on which work is to be commenced at once.

BISMARCK, N. DAK.—Bids are wanted September 5 by J. W. Healy, County Auditor, for building a bridge in Burleigh County.

CHICAGO, ILL.—A contract is reported let for the superstructure and foundations for the North avenue bridge to Jackson & Corbett at $81,000 and Roehmhela & Galley at $112,000, making a totatl of $193,000.

CLEVELAND, OHIO.—The War Department has approved the plans submitted by the Cleveland Terminal & Valley Railroad for its proposed bridge to be built over the old bed of the Cuyahoga river at this place.

EAGLE PASS, TEX.—The Galveston, Harrisburg & San Antonio, it is said, will at once rebuild its trestle bridge 750 ft. long, which was recently destroyed by fire.

FREDERICTON, N. B.—Bids are being received by C. H. LaBillois, Commissioner of Public Works, for rebuilding the Wilson bridge in Carleton County and the Piccadilly bridge over Trout River, in Kings County.

HACKETTSTOWN, N. J.—Bids are wanted by David McClellan, of Hackettstown, for building an iron bridge over the Musconetcong River, near this place.

INGERSOLL, ONT.—The City Council has decided to build a steel bridge over the river at McKeand street.

GERMANTOWN, IND.—A new iron bridge will be built over Plum creek south of this place during the present year.

LA CROSSE, WIS.—A resolution will be introduced in the City Council to authorize the building of a high bridge over the La Crosse river to cost between $40,000 and $50,000.

LAWTON, OKLA. T.—Contracts are to be let by Charles E. Gordon, Chief of the United States Geological Survey, with headquarters at this place, for building about 30 steel bridges in Comanche County.

LEXINGTON, KY.—A vote will be taken next November on the question of issuing $27,000 of viaduct bonds.

MONTREAL, QUE.—The City Council and the Canadian Pacific are reported to have reached an agreement providing for the building of an overhead bridge over the railroad tracks.

NEW YORK, N. Y.—A contract will soon be given for building the Manhattan terminal of the Williamsburgh bridge at the foot of Delancey street, for which plans have been completed by the Bridge Department. The cost of the work will be $1,000,000. The terminal will be entirely below the surface of the ground; it will be 600 ft. long x 180 ft. wide, and will contain eight loops. The work, it is expected, will be completed by next spring.

Surveys have been made by the Bridge Department and plans are under way for building of the Hudson Memorial Bridge over Spuyten Duyvil creek at a cost of $2,000,000. An appropriation of $10,000 for preliminary survey work was made some time ago. (See Construction Record.)

PAISLEY, ONT.—Bids are being received by J. C. Gibson, Town Clerk, for a bridge over Willow creek.

PENSACOLA, FLA.—Bids are wanted October 1 by the joint Boards of County Commissioners of Escambia County, Fla., and Baldwin County, Ala., for building a steel bridge over the Perdido river between these two counties. Plans are on file with A. M. McMillan, Clerk of the Circuit Court of Pensacola, Fla.

ROCHESTER, N. Y.—The New York Central, it is said, has changed its plans for the West Shore bridge over the Genesee river south of this place. It was originally intended to build a pier in the center of the river; the new plans call for a single-span structure.

SAN JUAN, PORTO RICO.—Bids are wanted September 30 by the Bureau of Public Works of the Department of the Interior for a steel truss highway bridge, 226 ft. long, for delivery on the dock at San Juan; also, on the same date, for a steel riveted highway bridge, 100 ft. long. J. J. Jimenez is Superintendent of Public Works.

SPOKANE, WASH.—The Spokane & Inland Electric Railroad Co. is making plans to put up two bridges over the Spokane river with total length of 1,000 ft.

Other Structures.

CENTRALIA, ILL.—The Chicago, Burlington & Quincy has bought a large plot of ground at this place on which it will put up repair shops.

CHICAGO, ILL.—The Chicago & Western Indiana, it is said, has bought a large plot of ground with a frontage of 798 ft., on which it will build a large freight warehouse.

CLEVELAND, OHIO.—The Wheeling & Lake Erie, it is said, has plans ready for putting up a large passenger station at this place.

CORTLAND, N. Y.—The Lehigh Valley, it is said, has decided to put up a new passenger station at this place.

CRANFORD, N. J.—The Central of New Jersey has given a contract to Lammerding & Devine, of this place, for the substructure of a new passenger station to cost about $30,000.

JERSEY CITY, N. J.—The Erie, it is said, will make improvements at various places along its road, to include new roundhouses of 10 stalls each at Hammond, Ind., and Marion, Ohio; one of 15 stalls at Port Jervis; one of 14 stalls at Kent, and one of six stalls at Bradford, Pa. Each house will be provided with new ash handling and coaling plants and cinder pits.

NEW YORK, N. Y.—The Long Island, it is said, has plans ready for putting up a new ferry house at the foot of 34th street. The building will be 400 ft. long and 170 ft. deep and will cover the five new slips the company is now building.

The New York Central & Hudson River has filed plans for a two-story brick electric sub-station to be built at 50th street from Park avenue to Lexington avenue. The new station will have a frontage of 361 ft., a depth of 39 ft., and will cost about $130,000. It will be the most important sub-station supplying power for the operation of trains in and out of its new terminal.

WAYCROSS, GA.—The Atlantic Coast Line has commenced the preliminary work of building its new shops at this place.

WHEELING, W. VA.—The Baltimore & Ohio has given a contract to Horr & Kinner, of Columbus, for the substructure for its new passenger station to be built at a total cost of $300,000.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—Announcement has been made that this company has definitely decided the proposed route of its trunk line from Galveston to the Pacific coast. The surveys which have been completed run from Weatherford, Tex. (which is already connected with Galveston), to Texico through a level country for a distance of 250 miles, and thence by the Belan cut-off now under construction and over the El Paso line to Silver City, where connection will be made with the Santa Fe, Prescott & Phœnix, now under construction in an easterly direction. The plan to build a line from the Pacos Valley lines to Rincon has been abandoned.

ATLANTIC COAST LINE.—Plans are being made to build a large freight yard 1½ miles long and 750 ft. wide at Waycross, Ga.

BERLIN, PRINCETON & WESTERN.—Surveys are being made for this proposed road from Berlin, Wis., south to Princeton, thence west to Necedah, a distance of 77 miles. Henry Behm, of Chicago, is the promoter. The Chicago & North-Western is said to be back of this project.

BONNERVILLE & SOUTHWESTERN.—This company has secured the necessary capital, completed surveys, and secured the right of way for its proposed road from Bonnerville, Ark., to Jelks, a distance of 65 miles. Contracts for building have been let to the Frisco Construction Co. (May 12, p. 158.)

CANADIAN VALLEY & WESTERN.—Bids for building a line from Chickasha, Ind. T., to Lehigh, it is said, will be let by this company about September 1.

CANEY, OKLAHOMA & TEXAS.—A contract has been given by this company to W. R. Stubbs for building its road from Caney, Kan., to Perry, a distance of 116 miles. The road, which is backed by Eastern Pittsburg bankers, it is said, will be operated by either the Missouri Pacific or the Atchison, Topeka & Santa Fe.

CHICAGO & EASTERN ILLINOIS.—This company, under the direction of General Manager H. I. Miller, has begun to make improvements, for which $1,500,000 was recently appropriated. Nearly all parts of the line from Chicago and Terre Haute will be laid with new and

heavier rails, new passing tracks and switches, and the installation of a new modern block system.

Chicago & North-Western.—According to reports, this company is planning to make improvements on its Galena division, to include the laying of four tracks for a distance of 30 miles as far as West Chicago. The tracks are being elevated between Ada street and Western avenue, and a new freight yard with a capacity of 5,000 acres is under construction between Melrose Park and Elmhurst. The new yard will contain more than 25 miles of side tracks.

Announcement has been made confirming the report that this company has bought the right of way of the Rapid City, Missouri River & St. Paul Railroad, which will give a connecting link for the Chicago & North-Western from Pierre, S. Dak., to the Rapid City line.

Chicago, Burlington & Quincy.—The improvements to be made by this company during the present year at an expenditure of about $350,000, it is said, will include a new track from Forest City, Mo., to Parkville; a cut-off from Beverly to Waldron, in Platt County, and taking out three curves between Waldron and Parkville; also a cut-off at Nodaway and Forest City. The most important work is the cut-off from Beverly to Waldron. Twelve miles of track will be laid and the distance between the two places will be shortened by about 1½ miles. The work also includes the building of a new bridge over Bush creek.

Chicago, Milwaukee & St. Paul.—Announcement has been made that this company is about to lay tracks on about 75 miles of road in South Dakota. The new extension, it is said, will run west from Lyman County, the proposed terminus of the extension now under construction.

Cleveland, Cincinnati, Chicago & St. Louis.—An officer writes in regard to the work being carried out by this company from Haughville, Ind., to Augusta, that this work is a relocation of five miles of the Chicago division. The present line is very crooked, following Crooked creek and the White river, and has six large bridges and a great deal of curvature. The line from Haughville to Augusta is intended to take the place of this crooked portion. The relocation is a tangent, and will reduce the line considerably. The work was decided upon when it became necessary to double track the existing line.

Columbus, Marion & Bucyrus (Electric).—An officer writes that contracts for building this proposed electric railroad from Marion, Ohio, to Bucyrus, a distance of 17 miles, will be let at once. The work does not include any steel bridges or tunnels. John G. Webb, of Springfield, Ohio, is President. (August 18, p. 54.)

Denver, Kansas City & Gulf.—Application, it is said, has been made by a company under this name for a charter in Kansas with a capital of $2,000,000 to build 300 miles of line, with branches, from a connection with the Burlington lines on the north either at Oronoque, in Norton County, Kan., or Republican Junction, in Harlem County, Neb., south to Hayes City, Kan., and then through Great Bend or Larned to Pratt, passing out of Kansas at Kiowa. At Cherokee, Okla. T., it will connect with the Denver, Enid & Gulf, running east from Oklahoma City to Texarkana, where it will connect with the Texas & Pacific. The headquarters of the company will be at Medicine Lodge, Kan. The incorporators include: Breckenridge Jones, of St. Louis; E. L. Peckham, of Blackwell, Okla. T.; J. J. Cunningham, of Enid, Okla. T.; C. J. Rhoads, of Medicine Lodge; W. C. Robinson, of Winfield, and others.

Edmonds & Eastern.—Rights of way have been secured by this company and contracts will shortly be let for building its proposed road for a distance of 36 miles. (June 27, p. 183.)

Gainesville Midland.—An officer writes in regard to the Gainesville & Athens Construction Co. that it was organized by the Gainesville Midland to build its extension from Jefferson, Ga., southwest to Athens, a distance of 18 miles.

Grand Trunk Pacific.—A company to be known as the National Construction Co., it is reported from Montreal, has been formed to build the Grand Trunk Pacific, and is asking bids for building 500 miles of the road west from Winnipeg and for the section between Port Arthur and the main line.

Houston, Beaumont & Red River.—A contract is said to be let by this company to P. R. Turney, of Houston, Tex., for building the first 40 miles of its proposed road from Houston, Tex., to Alexandria, La. (July 28, p. 31.)

Kentucky Roads.—J. T. and Floyd Day, who own large timber interests in Kentucky, will build a narrow-gage lumber road from Torrent, in Wolf County, to Campton, about 12 miles.

Lake Shore & Michigan Southern.—A contract has been given by this company to the Ferguson Contracting Co., of New York and Pittsburg, at about $2,000,000 for grading at various points about 34 miles of the Franklin & Clearfield branch, to be built from Franklin, Pa., to Brookfield, a total distance of about 60 miles. The work includes the piercing of a tunnel 950 ft. long, and the excavation of 3,500,000 cu. yds. of earth and for 100,000 cu. yds. of masonry. Other contracts reported let are: Crary Construction Co., of Binghamton, N. Y., two tunnels, one 3,000 ft. long and the other 1,000 ft., and the masonry work on a bridge over the Clarion river; to the Thomas McNally Co., of Pittsburg, for the masonry work of a bridge over the Alleghany river, and to the Miller Construction Co., of Lockhaven, Pa., for the grading and masonry work on about 20 miles of the line.

Lima Eastern.—A charter has been granted this company in Ohio, with a capital of $100,000, to build a railroad from Lima to Marion, which is to be operated by gasolene power. The incorporators include F. C. Oleson, C. H. Chappell and others.

Louisiana Midland.—This company has filed its charter in Louisiana with a capital of $10,000,000 and headquarters at Homer. The company proposes to buy or build a railroad from some point near Magnolia, Ark., running in a southerly direction through Columbia County, Ark., and through the counties of Claiburne, Bienville, Natchitoches, Rapides and Calcasieu Counties, La., to Crowley, in Arcadia County, La. The officers are: George Hunter, St. Louis, President; Hugh C. Brown, Ruston, La., Vice-President, and W. N. Crouch, St. Louis, Secretary.

Mexican Roads.—According to reports from Mexico, the Royal Trust Co., of Chicago, which is the bankers of the Swift Packing Co., will build a narrow-gage railroad from Toluca to Poente de Ixtle and from Toluca to Zecualpan. R. J. Kerr, representing the Royal Trust Co.; Telesforo Garcia, owner of a concession from the Mexican Government for a parallel line; G. H. T. Shaw; Joan Henkel, who owns a narrow-gage road between Toluca and Tenango and Toluca and San Juan de las Huertoa, about 32 miles long, and C. V. Tackaberri, of the Los Arcos Mining Co., are interested in the proposed line. Negotiations have been completed for the purchase of the Henkel Railroad. This will be the first link of the proposed line. It is proposed to issue $3,000,000 of gold bonds, which have been underwritten by the Royal Trust Co. at 90, and stock to the value of $20,000 per kilometer of the road's length will be issued. G. H. T. Shaw, Chief Engineer for the road, has commenced surveys.

Montana Roads.—Construction work, it is said, has been commenced on a railroad, in which Marcus L. Hewitt, of Basin, is interested. The proposed road will extend from Basin, Mont., to Kalispell, and will be 200 miles long, passing through a rich timber and agricultural section.

Montreal & Southwestern Counties.—This company has obtained the right of way over the Victoria bridge from the Grand Trunk, and will at once commence the construction of an electric road from Montreal to Longueuil via St. Lambert.

New Jersey Short Line (Electric).—A contract has been given for building this proposed electric road to Cole & Tomson. The proposed route is from Milltown, the present terminus of the Trenton & New Brunswick road, to Elizabeth, N. J., over which high-speed electric cars are to be operated, giving a through route in connection with the Trenton & New Brunswick from Trenton to Elizabeth.

New York City Subways.—The Board of Rapid Transit Commission has been notified by the Board of Estimate that that body has approved the maps and routes of the subways as laid down by the Rapid Transit Commission, to be built in the boroughs of Manhattan and Brooklyn. Plans for carrying out the work will be completed at once and contracts let.

New York, New Haven & Hartford.—At a recent meeting of the directors of this company it was voted to at once build an electric road from Thomaston to Waterville, for which surveys are being made.

Northern Pacific.—The certificates filed in the State of Washington by this company, providing for the building of a road in the Yakima Valley, is for the construction of the Sunnyside branch. This was the road which the farmers of that section, represented by Walter Granger, of Zillah, projected, but were unable to complete, and which the Northern Pacific will finish. The road will be about 20 miles long through a rich farming section from Toppenish to Mabton, Wash.

Oklahoma & Cherokee Central.—A contract has been let to Maney Bros., of Oklahoma City, for building the first 14 miles of this proposed road from Chelsea to the Verdegris River. The road will eventually be extended to Pryor Creek via Bartlesville, Ind. T., a distance of about 60 miles. (April 7, p. 110.)

Pennsylvania Lines West.—Announcement has been made that a contract has been let to William Bros. & Morse, of Cleveland, for the elevation of the Cleveland & Pittsburg tracks through Newburg, a suburban section of Cleveland, Ohio. The work includes the elevation or depression of tracks at five crossings, on which work is to be started at once. The contract calls for the excavation of 194,000 cu. yds. of dirt and the building of 10,000 cu. yds. of masonry and

extends over a distance of 7,000 ft. in Newburg. The entire improvements cover a distance of about seven miles.

PITTSBURG & BUTLER STREET RAILROAD.—A contract has been given by this company to the Ferguson Contracting Co., of Pittsburg and New York for the grading, masonry work and track laying on its proposed electric railroad from Etna, Pa., north to Butler, touching Mars and Velancia. Its length will be about 35 miles, which will be seven miles shorter than the Baltimore & Ohio between these points. At Etna, the line will connect with the Pittsburg Railways Co. The companies are planning to run cars through Pittsburg and Butler. The officers of the company are principally Pittsburg capitalists, several of whom are connected with the Pittsburg Trust Co.

PITTSBURG & CROSS CREEK.—A charter has been granted this company in Pennsylvania, with a capital of $70,000, to build a railroad from Pryor station on the main line to the Wabash-Pittsburg Terminal in a northerly direction along the north branch of Cross creek to a connection with the Pittsburg, Cincinnati, Chicago & St. Louis Railroad at Burgettstown, Washington County, Pa., a distance of seven miles. The directors are: N. F. Sanford, Pittsburg, President; J. W. Boileau, B. U. Young, S. A. Wartman, W. Craig Lee, F. P. Patterson and J. R. D. Huston.

PITTSBURG & LAKE ERIE.—Announcement has been made that this company has begun the construction of a third track from Shamokin to Aliquippa to increase its facilities for the rapid handling of freight.

PITTSBURG SUBWAYS.—Application has been made by a syndicate headed by Murray M. Verner and Mayor William B. Hayes, for a charter to build a subway to cost $10,000,000, starting at Oliver avenue and Smithfield street, reaching the surface at Neville street, in Bellfield, where the line will become a surface line. A franchise for the line through the down town district has already been granted and construction work will be commenced soon.

RIO GRANDE WESTERN.—A contract has been given by this company to the Utah Construction Co. for the extension of the Bingham branch from the mouth of Bingham Canyon to Pleasant Green and Blackrock, Utah, a distance of 17 miles. The work includes the excavation of about 234,000 cu. yds. at Pleasant Green and about 400,000 cu. yds. near Blackrock.

SEABOARD AIR LINE.—Preliminary surveys have been made by this company for locating a new line from Elberton, on the present Portsmouth-Atlanta route eastward to Augusta.

SHELBYVILLE & OHIO (ELECTRIC).—The promoters of this road are selling bonds to secure funds for the immediate building of the road. The proposed route is from Milton, Ky., opposite Madison, Ind., via Carrollton, Campbellsburg, New Castle and Eminence to Shelbyville, a distance of 50 miles. (June 2, p. 184.)

SOUTHBOUND RAILROAD.—Surveys are being made by Captain A. H. P. Cornell for this company to build a railroad from Winston-Salem, N. C., south to Wadesboro via Arcadie, a distance of about 90 miles.

SOUTHERN PACIFIC.—An officer writes that plans are being made by this company to build a railroad from Drain, Ore., southwest to Marshfield, on Coos Bay, a distance of 50 miles, where connection will be made with the Coos Bay, Roseburg & Eastern, which runs from Marshfield via Coquilla to Mertle Point, 28 miles, with a branch to Beaver Hill. The proposed line, when completed, will open up a good agricultural country in the valley of the Umpqua river, and will reach extensive timber lands and coal mines in the Coos Bay district.

SYRACUSE NORTHERN TRACTION.—This company has been incorporated in New York with a capital of $1,000,000 to build an electric railroad from Syracuse and North Bay, on Oneida Lake, and Brewerton, Onondaga County, and Bridgeport and Shakelton's Point, in Madison County. The directors include: William M. Brown, of Newcastle, Pa.; W. K. Niver, W. H. Plump and L. L. Waters, of Syracuse.

TONOPAH TERMINAL.—This company has been incorporated in California to build a railroad from Liberty via Goldfish Junction and the north end of Lone Mountain to Silver Peak, a distance of 100 miles. Camp Bros., of Philadelphia, are said to be interested. W. C. Wynkoop is President, and S. H. Park, Secretary.

VANCOUVER, VICTORIA & EASTERN.—A contract is said to have been given to P. Welch, of Spokane, Wash., for building 14 miles from Midway, B. C., west. The road will eventually be extended to Oroville, Wash.

WACCAMAW RAILROAD.—A charter has been granted a company under this name in North Carolina, with a capital of $250,000, to build a railroad from a point on the Cape Fear river near Oldtown, in Brunswick County, west to Lake Waccamaw, thence to connect with the Atlantic Coast Line at Bolton, and with the Seaboard Air Line at Manlyville, a distance of 50 miles. The incorporators include: E. Nelson, of Detroit; E. S. Hartwell, Chicago; J. E. Clark, C. E. Clark, E. H. Silliman and W. H. Chadbourn, of Wilmington, all of whom are connected with the Waccamaw Land & Lumber Co.

WALLULA PACIFIC.—A charter has been granted this company in the State of Washington to build a railroad from Wallula to Vancouver, Wash., a distance of 100 miles. The road, it is said, is intended to be an active competitor of the Oregon Railroad & Navigation Company's lines, and it is thought to be a Northern Pacific project. The incorporators are: L. Gerlinger, of Portland, and G. M. Lyons and Joseph Stapleton, of Vancouver.

WARREN, JOHNSVILLE & SALINE RIVER.—A charter has been granted a company under this name in Arkansas with a capital of $50,000 to build a railroad from Warren, in Bradley County, Ark., southeast for a distance of 25 miles. S. H. Fullerton, of St. Louis, Mo., is President; C. L. Robinson, of St. Louis, Secretary, and J. F. Forsyth, of Warren, Ark., General Manager.

WESTERN MARYLAND.—This company has begun its proposed work of double tracking its line from Baltimore to Emory Grove, for which bids have been in for some time. A contract has been given to Walter A. Thorne for widening the roadbed on the first section from Fulton station to Walbrook.

ZITACUARO-XOCONOSCO.—Announcement has been made by William McLachlin, Manager of this railroad, that it will soon be put in operation. The road, which is narrow gage, has been built for logging purposes, and runs from Zitacuaro, the terminus of the Michoacan & Pacific, to Xoconosco, in the State of Mexico, where the company's timber lands are located and where it is at present building a large lumber mill.

RAILROAD CORPORATION NEWS.

CANADIAN PACIFIC.—The report of this company for the year ended June 30, 1905, shows gross earnings of $50,480,882; working expenses, $35,006,794; net earnings, $15,475,088; their income from other sources was $1,584,663, making a total net revenue of $17,059,751, as against $15,904,373 for the previous year. The sum available for the payment of dividends after all fixed charges had been met was $8,875,685. After dividends had been declared of 2 per cent. on preference stock and 3 per cent. on common stock for the half-year ended June 30, a surplus for the year of $1,784,533 was carried forward.

This company, it is said, has bought control of the new Bellingham Bay & British Columbia Railroad, which runs through rich mineral and lumber sections of Western Washington, giving the Canadian Pacific a direct outlet to Puget Sound.

CENTRAL OF GEORGIA.—The report of this company for the year ending June 30, 1905, shows a surplus of $106,665 for the year after paying $750,000, which was 5 per cent. on three classes of income bonds amounting to $15,000,000. The road carried 4,008,111 tons of freight, as against 3,928,373 the previous year, and received 1.144 cents per ton-mile, as compared with 1.113 cents the previous year.

CHATEAUGAY & LAKE PLACID.—Announcement has been made that this company has been leased to the Delaware & Hudson Co. until 2403. The road, which runs from Plattsburg to Lake Placid and from Saranac Lake to Lake Placid, is 83 miles long, and has been operated by the D. & H. since January 1, 1903. The road has been changed from narrow to standard gage. The bonds are guaranteed by the D. & H., who will also pay 4 per cent. dividend upon $2,000,000 preferred stock of the leased line.

CONSOLIDATED RAILWAY (N. Y., N. H. & H.).—The annual report of this company for the first year of its existence ending June 30, 1905, shows that the company controls 525 miles of electric railroad. The next earnings for the year over and above all charges were $426,000. The capital of the company is $10,000,000, all of which is owned by the New York, New Haven & Hartford, with the exception of 15 shares.

GAINESVILLE & GULF.—Announcement has been made that this road, which began construction in 1885, and was completed in 1900, running from Sampson City, Fla., to Fairfield, a distance of 48 miles and connecting with the Georgia Southern & Florida at Sampson City, has been sold to F. M. Simonton, of Tampa; A. P. Stuckey and B. W. Blunt, of Ocala, Fla. It is said that the Southern Railway is back of the purchase of this property, and will extend the road at once to Tampa, shortening the route to that place from the west by about 50 miles. The officers elected are: S. F. Parrott, of Macon, President; A. P. Stuckey, First Vice-President; B. W. Blunt, Second Vice-President; H. E. Taylor, Gainesville, Treasurer; L. E. Barker, Gainesville, Superintendent, and W. S. Banks, Gainesville, Auditor.

GALVESTON, HARRISON & SAN ANTONIO.—This company, on August 8, 1905, under authority of an act of the Legislature of Texas, bought the New York, Texas & Mexican Railway, the Gulf,

Western Texas & Pacific and the San Antonio & Gulf, which will in future be operated as the Victorian division of this company. The company also bought, under authority of the same act, the Galveston, Houston & Northern, which has not yet been transferred.

Interborough Rapid Transit.—The quarterly report of this company ending June 30, 1905, gives gross earnings for the year of $16,837,367, an increase over the preceding year of $2,649,684, during which time only the Manhattan division was in operation. Operating expenses for the year were $7,397,384, an increase of $1,551,333, and net earnings were $9,439,983, a gain of $1,098,348. The surplus has been increased by $1,056,593.

Lehigh Valley.—This company has foreclosed the mortgage which it held against the Montrose Railway, and the property of the latter will be sold September 2. The road is 28 miles long, connecting Montrose, Pa., with Tunkhannock, the county seats of Susquehanna and Wyoming counties.

Lehigh Valley Transit.—Four electric roads in the neighborhood of Philadelphia, including the Lehigh Valley Traction, the Philadelphia & Lehigh Valley, the Allentown & Slatington and the Coplay, Egypt & Ironton companies, have been merged under the above name. The capital of the new corporation consists of $5,000,000 first mortgage bonds, $7,500,000 consolidated mortgage bonds, $5,000,000 preferred stock and $3,000,000 common stock, a total of $20,500,000. The new corporation owns a roadway 150 miles long with principal terminals at Chestnut Hill, on the outskirts of Philadelphia, and Slatington, in Lehigh County; also in Allentown. Colonel Harry C. Trexler, of Allentown, is President. The directors are: Arthur E. Newbold, Philadelphia; Tom L. Johnson, Cleveland, O.; Edward B. Smith, Harry C. Trexler, E. M. Young, David Young, Newark, N. J.; George O. Albright, Allentown; William F. Harrity and George H. Frazier, Philadelphia.

Mexican Central.—This company has decided to exercise its option to buy the stocks of the Mexican National Construction Co. on September 1. Over 90 per cent. of the stocks of the latter company have been deposited with the Commercial Trust Co., of Jersey City. By this purchase the Mexican Central will pay at the rate of $9.75 a share for the preferred stock, 50 cents for the common and 9¼ per cent. of its face value for the dividend scrip. The Mexican National Construction Co. has outstanding $700,000 of preferred stock, $100,000 of common stock and about $180,000 of dividend scrip. At the option price, the Mexican Central will pay about $700,000 for these stocks, for which it will get 59 miles of railroad running from Colima to Manzanillo and 30 miles from Zacatecas to Ojecaliente, a total of 89 miles. The 59 miles of road from Colima to Manzanillo will eventually give the Mexican Central's main line an outlet on the Pacific coast, the southern terminus of the Mexican Central at the present time being at Tuxpan, which is 40 miles northeast of Colima. The intervening 40 miles which must be built to connect with this purchase runs through a wild, rough country, and the work will require a great deal of tunneling and bridge work. It is the intention of the company to build this connecting link. It is understood that Ladenburg, Thalmann & Co. have formed a syndicate to buy $9,000,000 of an issue of $10,000,000 of 5 per cent. three-year notes to finance the purchase of the above railroad from the Mexican National Construction Co., and to pay for contemplated extensions towards the Pacific.

Minneapolis, St. Paul & Sault Ste. Marie.—At a meeting of the directors on August 22, which was a month ahead of the regular time, it was decided to declare the regular annual 4 per cent. dividend on the common stock payable October 15. The road has a surplus of $2,063,415, but the directors decided not to increase the dividend and to use part of the surplus for betterments.

The annual statement of this company, which is controlled by the Canadian Pacific through stock ownership, gives gross earnings of $8,716,621, an increase of $1,723,132, and net earnings of $4,214,014, an increase of $967,305. The surplus for the year was $2,063,415, an increase of $676,000.

New Jersey & Hudson River Railway & Ferry Company.—This company will redeem its first-mortgage 5 per cent. bonds on September 1, 1905, at 110. Announcement has been made by Millett, Roe & Hagen, of New York, that they will anticipate the redemption by cash or by exchange for the 4 per cent. bonds of the same company.

New York, Ontario & Western.—At the annual meeting of this company to be held September 27, the stockholders will be asked to confirm the lease made by this company with the Port Jervis, Monticello & Summitville, the Ellenville & Kingston and the Pecksport Connecting Railroads. These three small roads form a part of the system, all the capital stock being owned by the New York, Ontario & Western. The lease provides for the payment to them of an amount equal to the fixed charges. The directors have already passed upon the leases, which have been in force for some time, but will ask for the ratification from the stockholders.

North Pennsylvania (Philadelphia & Reading).—This subsidiary line of the Philadelphia & Reading has arranged to redeem its collateral trust 6s due September 1, aggregating $1,200,000. Funds available for the redemption have been made possible by the purchase of stock effected by the Reading Railway through the proceeds of the bonds. The North Pennsylvania owns the line between Philadelphia and Bethlehem, and a part of the New York division.

Nova Scotia Eastern.—This new company, incorporated to build 236 miles of railroad from the eastern coast of Nova Scotia to a connection with the Intercolonial and the Grand Trunk Pacific, proposes to issue in England $4,600,000 5 per cent. 50-year bonds at 92½. These bonds will be a first lien on the line and on a subsidy amounting to about $2,800,000. Interest during the construction will be paid for out of the subsidy. It is expected that the road will cost $23,000 a mile. A sinking fund is to be provided with the Norwich Union Life Assurance Society to meet the principal when due.

Oakland Traction.—A supplementary agreement has been filed by this company with the Union Trust Co., of San Francisco, the trustee under the $7,000,000 mortgage of January 2, 1905, maturing January 2, 1933, providing that by July 1, 1928, the sum of $6,000,000 in cash or its equivalent in bonds secured by said deed of trust shall be in the hands of the trustee for the redemption of the bond issue. The mortgage provides a sinking fund beginning in 1906 intended to retire $4,000,000 of the bonds by January 2, 1931.

St. Louis Southwestern.—The preliminary statement of this company for the year ending June 30, 1905, shows an increase of $1,210,000 in gross earnings and $797,775 in net earnings. The surplus over charges and payments of all kinds was $1,043,823, as compared with $538,409 in the previous year. The surplus is equal to 5.2 per cent. on the $20,000,000 preferred stock, and this stock is entitled to 5 per cent. non-cumulative dividends, but has not received any since the reorganization in 1890. The income account shows reductions made in expenses and maintenance of way amounting to about $90,000. The company has during the year funded its floating debt and car trust notes involving a considerable increase in fixed charges, but a decrease in interest payments and other charges.

Tractional Company.—Under this name a company is reported incorporated under the laws of New Jersey, with a capital of $100,000, $76,000 of which is to be issued immediately, to take over the entire stock of the International Traction Co., which has a capital of $15,000,000, and which owns the street railways of Buffalo, including the Buffalo Railway Co., the Buffalo, Tonawanda & Niagara Falls Electric, the Niagara Falls, Whirlpool & Northern Railway, and others, with a total length of about 375 miles. One share of the new company's stock is to be exchanged for each 100 shares of the International Traction Company's common stock. Henry J. Pierce, President of the International Traction Co., is also President of the new corporation, and Arthur Robinson is Secretary and Treasurer. The directors include: Thomas De Witt Cuyler, G. L. Boissevain, E. B. Schley, Nelson Robinson, and Henry J. Pierce.

Wheeling & Lake Erie.—William A. Read & Co. and Blair & Co., of New York, are placing an issue of $8,000,000 three-year 5 per cent. gold notes, which are guaranteed principal and interest by the indorsement of the Wabash Railroad. These notes mature August 1, 1908, and are subject to call at par on any interest date on thirty days' notice, and are secured under an agreement with the New York Trust Co., as trustee, by a deposit of $12,000,000 Wheeling & Lake Erie general mortgage 50-year 4 per cent. bonds dated August 1, 1955. The authorized issue of the general mortgage bonds is limited to $35,000,000, of which $5,000,000 is reserved to retire prior liens that are not yet matured. The proceeds of these notes will be used for double tracking and making other improvements and for new equipment. The Central Trust Co., of New York, is the trustee of the general mortgage.

York Street Railway.—After eight months' consideration, the Common Council of York refused permission to Philadelphia capitalists to build lines in that place and adopted an ordinance giving to the York Street Railway Co., and allied corporations, franchises to build electric lines and extensions. The ordinance provides that the York Street Railway Co. shall pay to the city 5 per cent. on gross receipts for the first five years, 6½ per cent. for the next five years and 8 per cent. thereafter, in addition to taxation fees on all its property.